amateur radio

Vol. 38, No. 10

OCTOBER, 1970

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amateur radio

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CONTENTS

COVER STORY

This month we depict the latest piece of equipment made available through Bail Electronic Services, Australian agents for Yaesu Musen Co. Ltd., Japan. It is the Yaesu FT-101 solid-state transceiver, designed particularly for mobile use, but will be found ideal for fixed or base operation. It ranges from 80 down to 10 metres, operates from in-built power source, either 12 volts d.c., or 100, 117, 200, 220, 240 volts a.c., and weighs only 30 lbs. A four-page, technical brochure is available on request.

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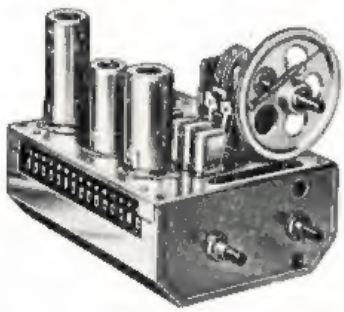

80, 40, 20, 15, 10A and 10B Metre Bands

It is designed to drive a 6146 (or 807) type tube, both in AM and CW operation, under any working condition, continuous (CCS) or intermittent (ICAS).

The high stability has been achieved by means of a beat-frequency oscillator. This equipment actually mixes the output signal of a quartz-crystal generator, with the output signal of a relatively low variable frequency generator, covering a 500 KHz. range on the 80, 40, 20 and 15 metre bands, and a 1 MHz. range on the two 10 metre bands.

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FEDERAL COMMENT

The Amateur Service is probably better prepared for the 1971 Space Conference than for any previous World Administrative Radio Conference.

I have reached this conclusion after talking to the officers of National Amateur Radio Societies in many countries, including the R.S.G.B. and the A.R.R.L. Only in the course of my visit to England has the attitude of many Societies finally been expressed in words, by the formulation of a policy by the Region I. Division of I.A.R.U. I am suggesting to the Directors of the I.A.R.U. Region III. Association that the same policy be adopted for our Region, and I would hope that it would be also adopted for Region II. If so, this would then be a global policy for all of the Member Societies of the I.A.R.U. This is in itself significant.

The more that one travels meeting Radio Amateurs throughout the world, the more one realises how much the problems of Amateur Radio are common to all countries. Certainly, attitudes on some matters differ; certainly, there must be room for different views, but in relation to those matters that are basic to our hobby the aims are common throughout the world. If these common aims can be expressed in like terms to each administration then the value of an international Amateur Radio organisation is put beyond argument.

This may all sound a little unreal—that is not so. Each member country of the International Telecommunications Union (the specialised agency of the United Nations that deals with the international allocation of frequencies and the formulation of international regulations) has one vote. Therefore the Amateurs in each country should, for their own protection, ensure that their administration is favourably disposed to Amateur Radio. But it must go further than this; merely to be favourably disposed—whilst it is good—is not enough. If the Amateur Societies of the world speak with one voice and seek the same objective, then a result favourable to the Amateur Service is far more likely.

The I.A.R.U. is the international organisation of National Amateur Radio Societies; by its constitution its administration is carried on by one society—The Headquarters Society—at present the A.R.R.L. By virtue of its Constitution, the officers of the Headquarters Society take like offices in I.A.R.U. The W.I.A. strongly supports the I.A.R.U., so strongly in fact, that at times it seeks from the Headquarters even more than it is doing already. This is not a measure of our discontent, but an expression of our faith in the importance of the I.A.R.U.

In addition, Regional organisations have been formed in each of the three Regions. These organisations, whilst at the moment not formally recognised by the I.A.R.U. Constitution, have in fact become part of the I.A.R.U. organisation and are in the best position to deal with those matters of more local concern—for example, European v.h.f. band planning in Region I. In addition, these organisations are able to support the I.A.R.U. Headquarters in the encouragement of Amateur Radio in those countries where Amateur Radio at present is not strong. Through these Divisions of I.A.R.U., and through the I.A.R.U. has come the awareness of the need for a common aim which leads me to make my opening observation.

The Region III. organisation was formed on the initiative of the W.I.A. in Sydney at Easter 1968. It is now really only in embryonic form with the W.I.A. providing the Secretariat. I am however, completely convinced of one thing — the W.I.A. together with N.Z.A.R.T. and J.A.R.L. must be prepared to bear a heavy burden, both financially and in terms of time, to ensure that this Regional organisations is successful. The problems that face us are enormous. We have no close-knit geographically small area like Europe to provide a core around which such an organisation can grow, as was the case with the I.A.R.U. Region I. Division. We face problems of vast distance and diverse cultures throughout our Region, but these are the very things that make the success of our Regional organisation essential. Just as we must have a strong national body, we must also have a strong international body.

The problems presented by the 1971 Space Conference for the Amateur Service have certainly not yet been solved, and there is much work yet to be done both internationally and in Australia within our own national Amateur Radio society, but, if at the 1971 Conference the Amateur Service is successful in obtaining those privileges that it seeks and does not lose any of its existing privileges, then this will be in no small measure due to the co-operation and mutual understanding that exists between national Amateur Radio societies in many countries.

—MICHAEL J. OWEN, VK3KI,
Federal President, W.I.A.

Putting the Decades to Work: A Low-Cost Counter

ROBERT H. BLACK, M.D., VK2QZ*

The avalanche of fan mail which followed publication of the description of a cheap counting and display decade† has stimulated this description of five of these decades connected together as a 100 KHz./sec. counter.

One of the three letters which, in fact, were received referred to an error in the circuit of the decade: the diode conducting the negative reset pulse to the quinary part is shown the wrong way round. Another modification which has been found necessary consists of a change in the values of the 220 pF. reset capacitors: the one going to the binary part of the decade should be increased to 1000 pF. and the one to the quinary to 1500 pF. to achieve reliable reset.

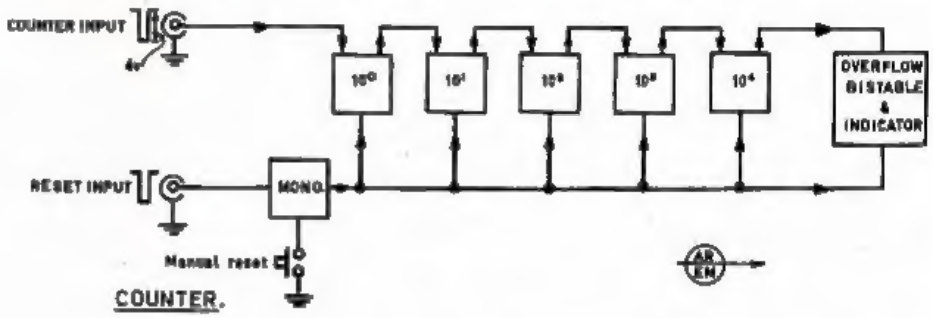
The diagram shows how the decades are connected, the final one drives a bistable to give visual indication that all the decades have been run through in a given count. The details of the overflow bistable and indicator are shown in the circuit diagram. No comment is necessary on this except to draw attention to the necessity to adjust the base resistor in the lamp driver to give adequate, but not excessive, illumination. You will find you have accumulated some type 071 transistors —they usually come along with the 086s.

Resetting of the counter and overflow indicator is achieved by means of a negative output pulse from a monostable which has a very short time delay. Why not a Schmitt trigger? Well, now I come to think of it, why not, indeed? I intended to use the delay time for count presentation but the size of the necessary capacitors got a bit out of hand. An alternative solution was found so the reset pulse generator remains a monostable. At the frequency of counting here the time delay has no effect on the count. Reset can be achieved either manually or by means of an external pulse.

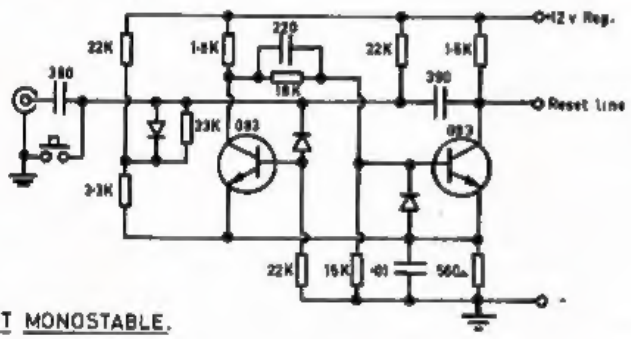
The power supply is routine. The rectifier diodes come with some of the computer boards. The power transistor RT931/122 is also from one of the boards—they come in pairs. The power transformer, electrolytic capacitors, zener diode and the AC128 will, unfortunately, consume a few dollars, but the total cost of the counter as such should be less than $40 (see previous calculation and, incidentally, 5% ¼ and ½ watt resistors are available at 3 cents each). If you are going to take a serious

(continued on page 15)

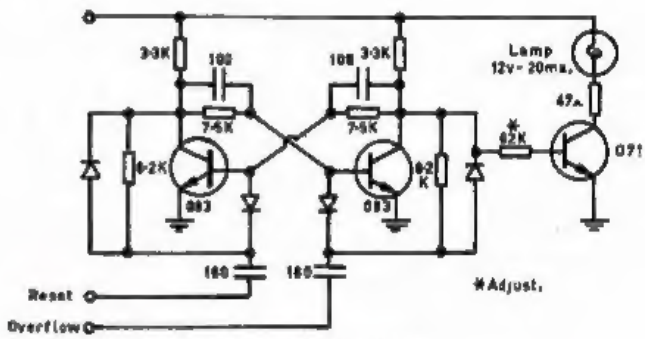
* 2 Yerton Avenue, Hunter's Hill, N.S.W., 2110.
† R. H. Black, "A.R." June 1970.



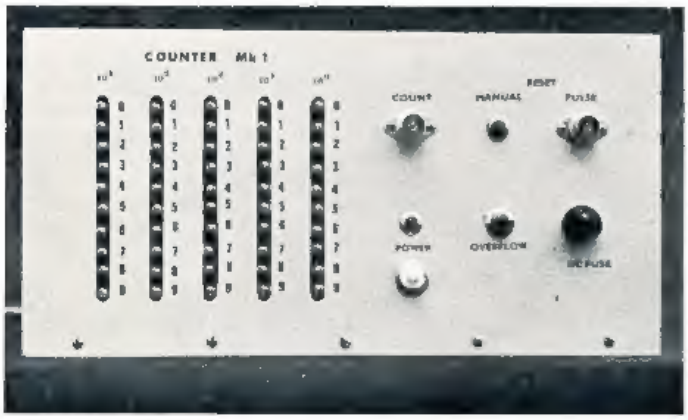
COUNTER.

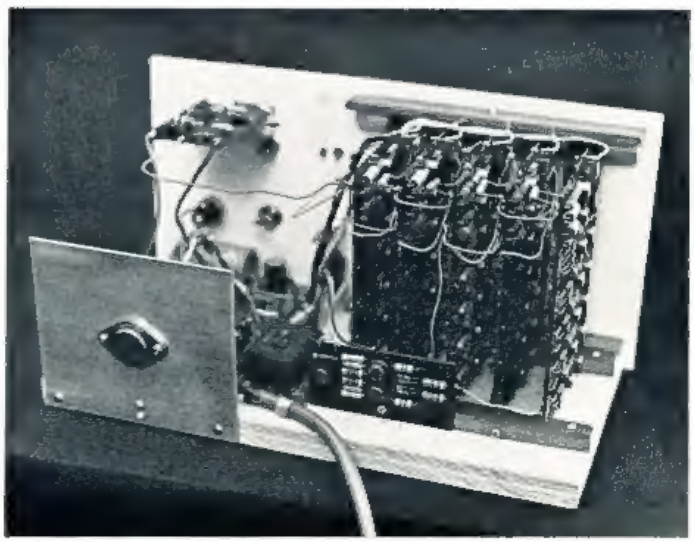


RESET MONOSTABLE.



OVERFLOW BISTABLE & INDICATOR.





Above: Front view of Counter showing arrangement of the decade lamps. The power indicator is a small neon and the overflow indicator lamp is fitted into an appropriate bezel.

Right: Rear view of Counter. The re-set monostable is mounted on the panel at the top left and the overflow bistable and lamp driver is on a small board behind the decades.

RESONANCE

LECTURE NO. 8

C. A. CULLINAN,* VK3AXU

Resonance may be defined as the natural period of vibration of matter in its many forms from the smallest to the largest.

For instance, the natural period of vibration of the atom Caesium 133 is 9,192,631,770 cycles, and on the other hand that of the Empire State Building is very low. In earthquake areas, skyscrapers are designed so that their frequency will not co-incide with the average period of shock-waves generated by earthquakes. This is done to reduce the earthquake damage to a minimum since physical objects can be vibrated to destruction if sufficient power is applied to them at their resonant frequency.

The classic example is the shattering of a wine glass by a musical note whose frequency is the same as that of the glass.

In radio work, electrical resonance plays a tremendously important part and may be defined as that condition which exists in series or parallel a.c. circuits when the inductive reactance (XL) and the capacitive reactance (XC) are equal so that they balance or cancel each other, and their nett effect on the circuit will be zero (i.e. their reactive effect is zero).

We have already learnt that an inductive reactance causes the current in an a.c. circuit to lag behind the voltage whilst a capacitive reactance causes the current to lead the voltage. Thus, when XL and XC have the same numerical value at a particular frequency, they cancel each other and any current flow will depend on the d.c. resistance which is present. It must be remembered that it is impossible to make any inductance or a capacitance which does not have some d.c. resistance.

Now let us remember some elementary mathematical expressions:

1. Any number multiplied by 0 (zero) = 0.
2. Any number divided by 0 (zero) = infinity ∞.
3. Any number to which 0 (zero) is added remains unchanged.
4. Any number from which 0 (zero) is subtracted remains unchanged.

Also let us refresh our memories of the formulae for reactance:

$$XL = 2\pi fL$$

and

$$XC = 1 \div 2\pi fC$$

where L and C are in Henries and Farads, respectively, and f is in cycles per second (Hz.).

An examination of these formulae shows that for any given value of L and C, as 2π is a common constant, then there will be only one value of f which will satisfy the equation XL = XC, and this frequency will be known as the resonant frequency for that particular value of L and C.

* 8 Adrian Street, Colac, Vic., 3250.

● Continuing the series of lectures by C. A. Cullinan, VK3AXU, at Broadcast Station 3CS for students studying for a P.M.G. Radio Operator's Certificate.

If L and C are in series, the circuit is termed as Series Resonant, and if they are in parallel then it is termed Parallel Resonant circuit. The resonant frequency can be determined by the formula:

$$f\ (Hz.) = 1 \div (2\pi\sqrt{LC})$$

and L and C from:

$$L\ (Henries) = 1 \div (4\pi^2 f^2 C)$$

and

$$C\ (Farads) = 1 \div (4\pi^2 f^2 L)$$

As mentioned before, the farad is a very large unit and it is more usual to use one microfarad as a reference unit, this being one millionth of a farad. The formula of the resonant frequency of an a.c. circuit then becomes,

$$f\ (Hz.) = 1000 \div (2\pi\sqrt{LC})$$

where L is in henries and C is in microfarads.

It should be obvious, also, from these formulae that for any given frequency there are countless combinations of L and C that will produce resonance at that frequency, but that for a given combination of L and C there can only be ONE resonant frequency.

Question: Consider a circuit in which an inductive reactance of 100 ohms is connected in series with a capacitive reactance of 100 ohms and that the circuit has a series resistance of 10 ohms. Power is supplied to the circuit at a pressure of 100 volts.

1. Find the current flowing in the circuit.
2. Find the voltage across each reactance.
3. Find the voltage across the resistance.
4. Find the power factor of the circuit.
5. Find the power in the circuit.

Comment: This question is somewhat similar to that asked earlier in our discussion on series a.c. circuits with, however, one important difference.

The question states that the two reactances have the same numerical value, therefore the circuit is series resonant and it follows that it must have unity power factor. Thus we can answer section 4 of the question without having to do any calculations, also it follows that the two reactances, together, will not consume any power, thus only the resistance will consume power. From Ohms Law ($C = E \div R$) we calculate that the current flowing in the circuit is 10 amperes and as the circuit has unity power factor, then the power will be 100 volts × 10 amperes = 1,000 watts, and the voltage across the resistance will be $E = C \times R$ = 100 volts.

Since each reactance is stated to be 100 ohms and current has been found to be 10 amperes, then the voltage across each reactance will be 100 × 10 = 1,000 volts. It must be remembered that the voltage across XL will be positive and that across XC will be negative, so that in the circuit they cancel each other.

Here then are the answers to the questions:

1. 10 amperes.
2. 1,000 volts.
3. 100 volts.
4. Power factor = unity.
5. 1,000 watts.

Comment: We were not asked to find the impedance of the circuit because it should be obvious that the impedance will be the same as the resistance.

We can prove this by using the formula used to calculate the impedance of a series circuit:

$$\begin{aligned} Z &= \sqrt{R^2 + (XL - XC)^2} \\ &= \sqrt{10^2 + (100 - 100)^2} \\ &= \sqrt{10^2 + 0} \\ &= 10 \text{ ohms.} \end{aligned}$$

Now let us examine some practical applications of series resonant circuits from the writer's own experience. For obvious reasons, frequencies have been changed.

Some time ago we were engaged in designing an impedance matching network to couple a co-axial transmission line to an aerial for single frequency operation.

Measurements of the aerial made with a radio-frequency bridge had shown that it had a resistance of 52 ohms and a positive reactance of 75 ohms at the operating frequency.

The impedance of the aerial is stated by the equation:

$$Z = 50 \text{ ohms} + J75.$$

The positive sign indicates that the aerial has an inductive reactance.

Now we learnt in discussing earlier the series a.c. circuit that maximum efficiency occurs when the circuit had unity power factor. Also discussing the question on series resonance in this lecture we found that a series circuit, when resonant, has unity power factor.

Now it would be possible to couple the co-axial cable to the aerial with the aerial impedance Z = 52 ohms + J75, but as the aerial would contain reactance the power factor would be less than unity so more power would have to flow into the aerial than was necessary.

Fortunately, we can "tune out" the reactance of an aerial by adding a

(continued on page 10)

ANOTHER IDEA FOR ROTATING BEAMS

KEITH F. HOFFMANN, VK4KH*

If you have a small back yard—want a rotary beam—then here is a different approach to the problem

Having obtained a prop pitch motor and gear box to rotate the beams, the only feasible way of using it seemed to be that it would have to be mounted on an old mill tower, and the usual method adopted. This was out of the question as it would have taken up too much room in the already smallish back yard. Again, the thinking cap was put on and the idea "why not rotate the whole tower?" came to my mind. This is how I adapted the idea for my situation.

The basic components used are a galvanised 60 ft., three-section winch up tower, prop. pitch motor and gear box for rotation, and selsyn motors for remote direction indication. The tower in my case is a galvanised one which was originally used as a television survey mast on the back of a van. The two bottom sections are of triangular cross section, each section being 22 feet long. They telescope neatly inside of each other. The top section consists of a 21 ft. length of 2" diameter steel tubing which telescopes inside the other two sections. The general construction of the tower can be seen clearly in the photographs. Any person handy with a welder should have no difficulty constructing a similar tower.

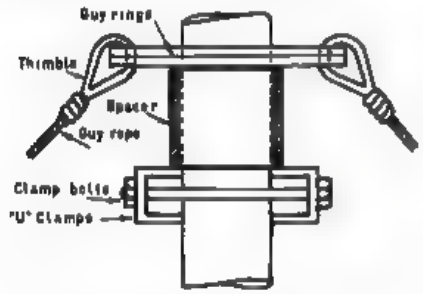


FIG. 1 GUY RING ASSEMBLY.

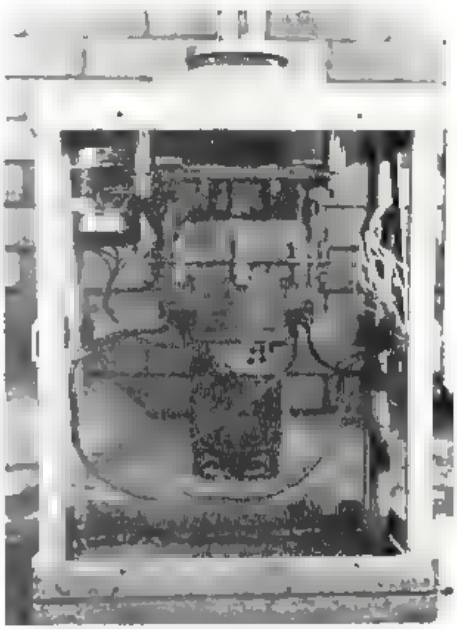
It is winched up and down by means of a small winch, which is built on to the tower, and 3/16" diameter steel rope. A ratchet is provided on the winch for the control of its operations. Its handle is also removable so people cannot bump into it and injure themselves. With the tower in the full-up position, the winch is locked by means of a ¼" bolt.

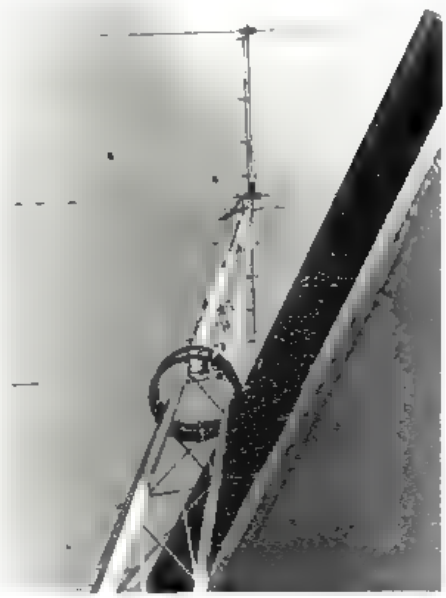
The top section has a clamp made from t.v. aerial fittings fitted to it. Its purpose is to prevent the top section from coming down in case the rope should break and also that the strain can be taken off the rope when the tower is in the full-up position. Likewise, the two bottom sections are held together with the use of a small "D" clamp across two struts. This makes the tower completely safe in case of rope breakages and children playing with the winch. The clamps are fitted after the sections are raised to the required height. No climbing is needed to do this as the job can be done while standing on the roof. The few extra minutes this takes is worthwhile for the peace of mind it gives that the tower will not telescope itself on its own accord.

The tower is held against the house by means of a bracket and a ring assembly around the bottom section of the tower. The bracket is coach-screwed to the facia. This serves to support the tower when it is being raised and lowered, and when it is in its nestled down position, which is about 22 feet high. This is a very convenient height in my case as it is shoulder height when standing on the roof. When fully raised it is supported by three guy wires, two going back to the roof and the other back to a nearby tankstand.

The rotatable guy ring is shown in Fig. 1. It consists of two t.v. guy rings, a pipe spacer 5" long and a t.v. mast clamp. The spacer is used to prevent the guy wires from fouling the clamp during rotation. Thimbles are used in the guy rings to prevent them from severing the guy wires.

The co-ax. cables are formed in a large loop over the guy ring so that they will bend sufficiently and have enough to prevent them from becoming tight as the guys push against them during rotation. T.v. mast straps are used to clamp the cables to the mast at points 18" above and 18" below the guy ring to form the loop. With this method the tower can be rotated through 420 degrees without any problem. Where the cables are clamped to the mast and where the guy wires are likely to rub against them, they are protected by wrapping rubber around them. The rubber used in this case was 1½" wide and is normally used for fitting between the glass and the frame in the assembly of aluminium framed windows. The cables are clamped at intervals down the mast and are secured in such a way that no deformation in the shape of the co-ax. takes place. The whole tower can be lowered to roof height in about four minutes, including unclamping.





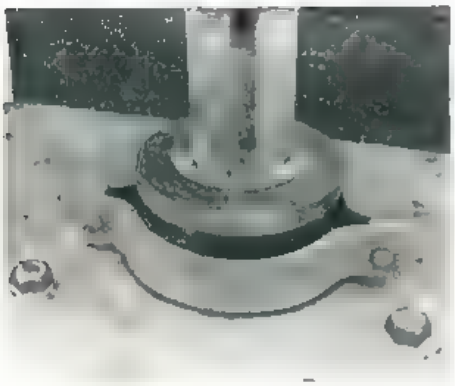
The tower sits on a large double race ball bearing assembly (out of a tractor) which is clamped on top of a steel frame. All the weight is taken on this bearing and the frame. The mountings can be seen in the photographs and Fig. 2. The gear box is mounted underneath the top plate by means of three large bolts. An appropriate size coupling, which fits firmly through the bearing, drives from the bottom of the gear box to the bottom of the tower. A 5" diameter by ½" thick plate is bolted to the top of this coupling by means of three 7/16" recessed studs. The tower, with its locating pin, is then held onto this plate by means of another three 7/16" studs

Any other suitable motor and gear box combination could be used to drive the tower as it takes very little to drive it. Wind loading on the antennas, which causes twist on the mast, should be

* 10 Druce Street, Toowoomba, Qld., 4350.

taken into consideration when choosing a suitable gear box. The drive gears may be stripped in the wind if these are not heavy enough

The frame where the motor fits into is made from 1" round uprights cross-braced with 1½" x 3/16" flat steel. The top plate is 3/8" thick. The whole assembly is welded and galvanised. Dimensions are 16" wide, 12" deep, 20" high. Weather proofing is achieved by means of an aluminium cover which is not shown The tower is also earthed via the frame to a 6 ft. earthing stake a few inches away from it.



The bottom section, which is almost identical to the top section, apart from the top plate, is concreted into the ground. The top section fits over the bottom section and is located by means of pins which fit firmly in the pipes and are welded to the top section. If the QTH has to be shifted you only have to make a new bottom piece and concrete it into the ground. The motor and gear box can be removed without having to do anything to the tower and is only a five-minute job.

The transmitter selsyn is mounted in such a way that it is driven directly by means of a fishing line "belt" from the tower gear box/coupling. A slotted adjustment is provided on the selsyn mount to tension the "belt". The electrical circuit of the selsyns and drive motor is shown in Fig. 3. The motor is run on 28 volts a.c. and appears to work satisfactorily, taking 1½ minutes for a revolution. Power is fed to the motors via a heavy duty multi-cored cable. At the moment the tower supports a three element tri-band beam and a 10 element 2 metre yagi. The assembly has been in operation 15 months at the time of writing and has been very satisfactory without any trouble. There is no reason why a telescopic t.v. mast could not be rotated in the same manner or even a length of water pipe. The ideas to further adapt the unit are almost unlimited.

☆

RESONANCE

(continued from page 8)

reactance of opposite sign in series with the aerial and this is what we did. So we connected a capacitive reactance of 75 ohms in series with the aerial.

Then the aerial impedance became:

$$\text{Aerial } Z = \sqrt{R^2 + (XL - XC)^2}$$
$$= \sqrt{52^2 + (75 - 75)^2}$$
$$= 52 \text{ ohms} \pm J0.$$

The aerial was now series resonant at the operating frequency, the power factor was unity and all the power fed to the aerial was used by the resistance of the aerial.

(In this discussion, dielectric losses in insulators and certain other losses have been ignored as they were of little consequence as the aerial was well designed.)

By making the aerial resonant so that the aerial became a pure resistance the design of the coupling network became simpler so that it was necessary only to match the a.c. resistance (impedance) of the co-axial cable to the resistance of the aerial.

The design of this network need not be considered at this stage.

Another practical application of a series resonant circuit concerned a fixed frequency transmitter. This transmitter produced an harmonic which was causing interference in the 7 megacycle (megahertz) Amateur band. The transmitter was coupled to the aerial by means of a 600 ohms two-wire balanced transmission line.

To reduce this harmonic to negligible proportions an inductance and a capacitance were connected in series. This combination was then connected directly across the output of the transmitter. The capacitance was made adjustable and the series combination was tuned to series resonance at the harmonic frequency, with the transmitter in operation. The tuning was done by setting up a distance communications type receiver, tuned to the harmonic, telephone communication was maintained between the transmitter and receiver operators and the network was adjusted at the transmitter to give a minimum reading on the receiver signal strength meter indicating that series resonance had been obtained.

At the harmonic frequency the inductive and capacitive reactances were equal and as good quality components were used, this series resonant circuit was a virtual short circuit at this frequency, however at the fundamental frequency of the circuit was very high, so that the circuit had negligible effect.

In practice the arrangement proved completely satisfactory.

AMATEUR FREQUENCIES:

ONLY THE STRONG GO ON — SO SHOULD A LOT MORE AMATEURS!

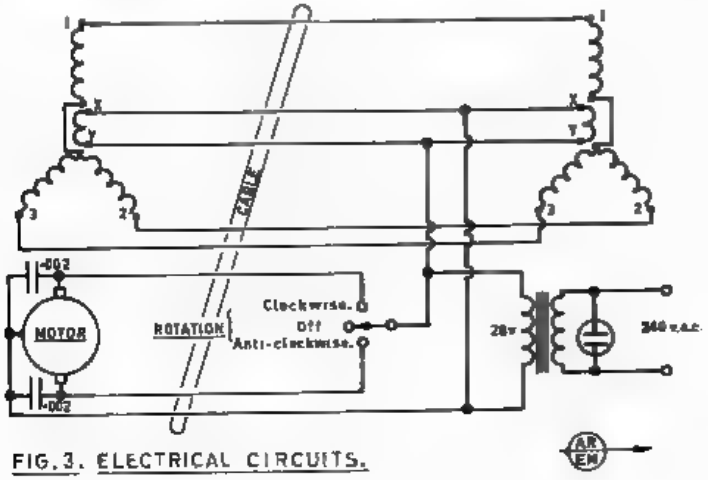


FIG. 3. ELECTRICAL CIRCUITS.

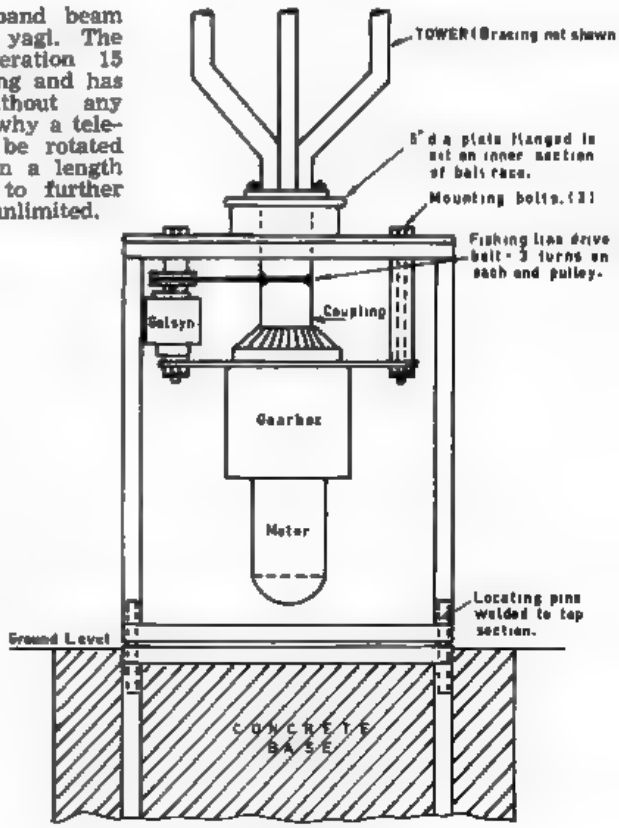


FIG. 2. TOWER MOUNTINGS.

Modifications to VK3 432 MHz. FET Converter for Operation on 576 MHz.

R. J. HALLIGAN, VK3AOT/T*

The VK3 V.H.F. Group 432 MHz. Converter,† which is available in kit form, has proved to be an excellent performer on this band. The possibility of using this converter on 576 MHz. is obvious in view of the small increase in frequency involved The modifications presented are simple and the measured performance on 576 MHz. very satisfactory.

OSCILLATOR-MULTIPLIER CHAIN

The original circuit used a bipolar transistor oscillator-doubler. The same basic circuit has been retained, however some changes were made to suppress tendencies towards parasitics with very active crystals. These effects were due to oscillation alternating between series and parallel modes.

The approach was empirical and the values, while being quite satisfactory in the author's converter, may not yet be optimum. The changes require no p.c.b. modifications. Only those values that have been altered are given on the circuit diagram—see Fig. 1a.

In the 432 MHz. converter, the oscillator-doubler stage was followed by two further doubler stages. For 576 MHz. operation, the final doubler is changed to a tripler, giving an overall multiplication of 12. Changes associated with the tripler circuit are shown in Figs. 1b and 1c. No other changes to coil details are required in this section.

The appropriate crystal frequency can be calculated from one of the following formulae:

Single conversion:

$$X = (576 - \text{I.F.}) \div 12$$

Double conversion:

$$X = (576 - \text{I.F.}) \div 13$$

where X = crystal frequency in MHz.

I.F. = final (tunable) intermediate frequency in MHz.

When ordering crystals the circuit should be supplied to the manufacturer.

MIXER MULTIPLICATIONS

The only modification necessary involves shortening L4. Details are shown in Fig. 2.

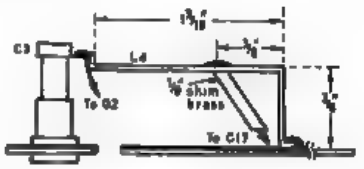


FIG. 2.

Modifications to mixer input circuit.

R.F. AMPLIFIER MODIFICATIONS

The modified amplifier circuit is shown in Fig. 3a. Output circuit changes are shown in Fig. 3b. Due to the reduced length of L3, it is necessary to re-locate the drain button bypass capacitor, C6.

Input and neutralising circuits require most changes. The input co-axial socket must be moved towards C1. Use is made of the area containing the input designation "IN". Heat the letters with a

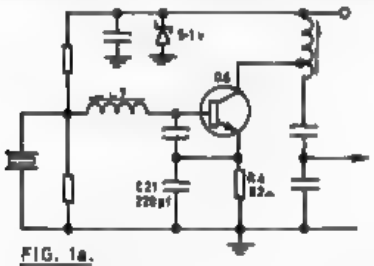


FIG. 1a.

L7—10 turns 30 B & S enamel wire, close wound.

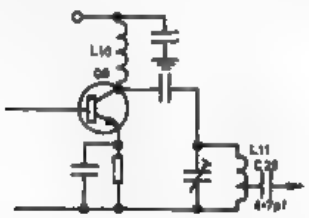
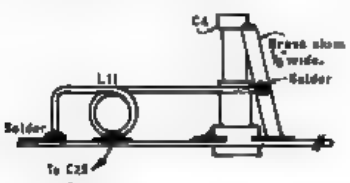


FIG. 1b.

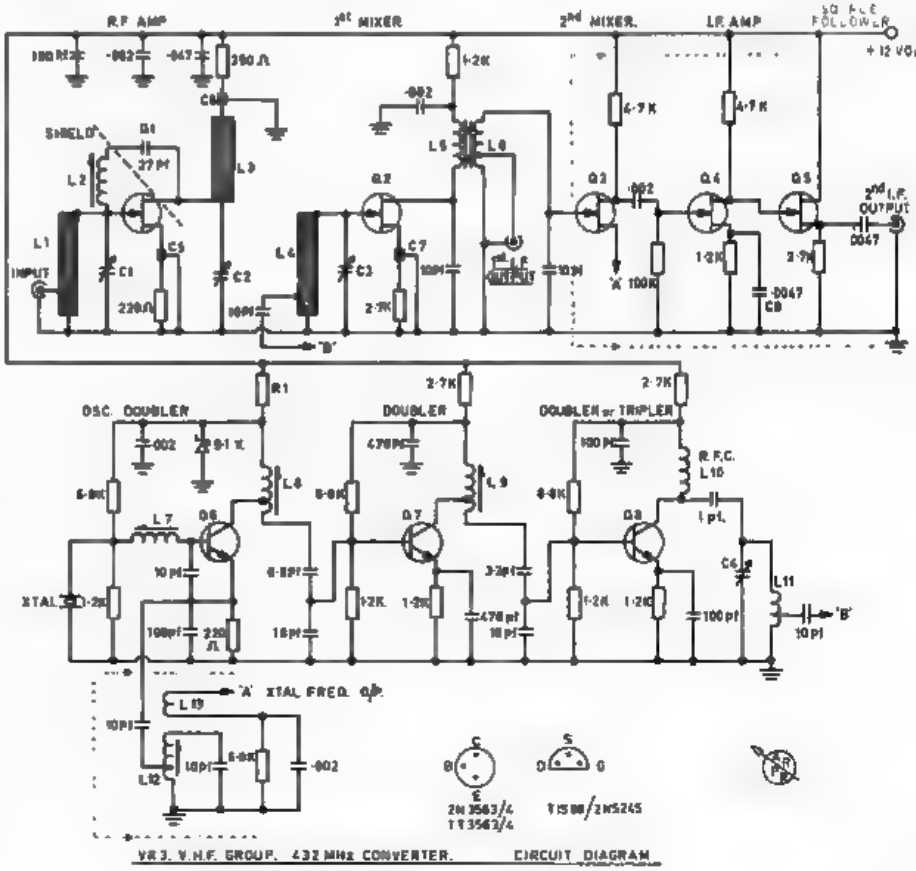
L10—3 turns 26 B. & S., 3/16 inch i.d., spaced over ½ inch.
L11—1 turn 18 S.W.G. See Fig. 1c.



F.G. 1c.

L11—1 turn 3/16 inch i.d. 18 S.W.G T.C.W.

Fig. 1.—(a) Modified oscillator circuit
(b) Modified circuit of final multiplier
(c) Physical layout of final multiplier.



* 41 Windsor Street, Mt. Waverley, Vic., 3149.
† "A.R.," January 1970.

soldering iron until the copper lifts. The letters may then be removed and a 1/16" hole drilled in the centre of this area. Drill 1/16" diam. holes either side of the centre hole and mount the co-axial socket. Further changes are shown in Fig. 3c. Note the re-location of the neutralising coil, L2.

PERFORMANCE

The converter was built up as a double conversion unit. Gain is similar to that observed for the original 432 MHz circuit. Sensitivity was measured as being 0.1 μV. at the input terminals for 6 dB. signal-to-noise ratio (a.m., 10 KHz. i.f. bandwidth, 100% modulation). A Hewlett-Packard u.h.f. signal generator type HP612A was used for this measurement. The test results correspond roughly to the minimum readable signal under normal operating conditions. No facilities were available for noise figure measurements.

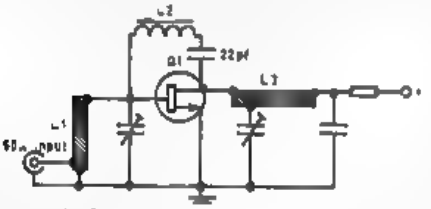


FIG. 3a.

L1—See Fig. 3c.
L2—3 turns 22 S.W.G. enamelled wire. See Fig. 3b.
L3—See Fig. 3b.

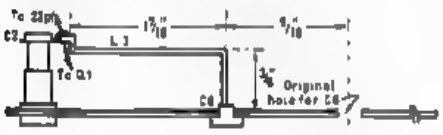


FIG. 3b.

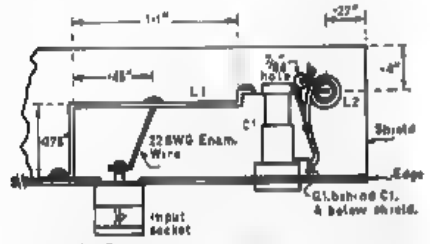


FIG 3c.

Fig 3.—(a) Modified r.f. amplifier circuit
(b) Physical layout of amplifier output
(c) Physical layout of amplifier input

CONCLUSIONS

The use of the VK3 V.h.f. Group 432 MHz. converter kit provides a ready means of receiving on 576 MHz. Varactor transmitters producing up to 20 watts of f.m./c.w. or 6 watts of a.m. can be constructed in a few hours. Perhaps with the availability of these designs more Amateurs will explore the exciting world of u.h.f.

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R." in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required

A.M.S.A.T. Hosts Distinguished Guests

A special meeting of the Radio Amateur Satellite Corporation (A.M.S.A.T.) held in Washington on 3rd July heard talks by Michael Owen, VK3KI, President of the Wireless Institute of Australia; R. A. Vanmuysen, ON4VY, Past President of the Belgium Amateur Society; Robert W. Deniston, W0DX, President of A.R.R.L.; A.R.R.L. Atlantic Division Director, Harry A. McConaghy, W3PEC.

The meeting also featured the presentation by Mr. Deniston of the League's 1969 Technical Merit Award to William L. Smith, W3GKP. The A.R.R.L. Board of Directors, at its 1970 meeting, conferred this award jointly on Mr. Smith and Paul M. Wilson, W4HHK, for their contributions to the art of moonbounce communication arising out of their e.m.e. experiments on the 2300 MHz. band.

Michael Owen, VK3KI, conveyed the thanks of W.I.A., Project Australis and Australian Amateurs generally to A.M.S.A.T., N.A.S.A. and the League for their various parts in the recent successful Australis Oscar 5 mission. He also expressed the anticipation for the next Amateur satellite which is felt in his country.

Jan King, W3GEY, Project Manager for A.M.S.A.T. Oscar-B (A-O-B), described progress on that satellite which will receive a regular Oscar designation once in orbit, hopefully about one and a half years from now. A-O-B, as presently planned, will contain two repeaters, both operating cross-band between the 144 MHz. and the 420 MHz. band. One will be a broadband linear device similar to previous Oscar's, while the other will be a channelised f.m. repeater. Sophiscated command and telemetry provision will be included.

Jesse Wagner, K3GKB/WA2UYF, presented a discussion of some of the ionospheric propagation results noted at the N.A.S.T.A.R. station K2SS during the lifetime of Australis Oscar 5.

In addition to the guests already mentioned, the meeting was attended by A.M.S.A.T. members and others interested in the Amateur space programme from as far away as Richmond, Virginia and the New York City area.

VK3 WESTERN ZONE, W.I.A.

ANNUAL CONVENTION

to be held at

NHILL

on

SATURDAY AND SUNDAY,
24th and 25th OCTOBER, 1970

Saturday 1400 onwards. Registration and rag-chew, office a dinner, guest speaker, entertainment.

Sunday 1030. Tour of Little Desert National Park, barbecue lunch, meeting.

Hotels, Motels, Caravan Park, Aerodrome.

Bookings with $2 deposit to, Jim Bywaters VK3AEF, 30 Queen St., Nhill, Vic., 3418.

Ne. Glanville, VK3AOD, President.
Bob Mitchell, VK3ARM, Secretary.

VK3KI talks back home to VK3ARD on 20 metres via the C.O.M.S.A.T. Club Station WA3IGO. Bob Deniston, W0DX, on the phone, while Harry McConaghy, W3EPC, A.R.R.L. Atlantic Division Director, looks on.

Keying Monitor and Band Edge Marker

R. TORRINGTON, VK3TJ*

One thing that was missed when changing from a transmitter-receiver combination to a transceiver was the key thumps whereby one could monitor quiet bug sending

A monitor using r.f. pick-up to activate the audio oscillator was first tried, but it was too critical in location even when an additional amplifier was added.

For those transceivers that do not provide a keying monitor, this unit may be useful. The transceiver concerned employs a keying circuit where —50 volts appears across the key contacts with the key open and so this device makes use of this feature.

Q1 and Q2 form the oscillator for the audio tone while Q3 is an audio amplifier. Q4 and Q5 form the switch to activate the audio oscillator in sympathy with the keying. The values of the resistors and capacitors in the oscillator need not be exactly as shown, but happened to be on hand and produce a suitable audio tone. Practically any speaker transformer can be used. Only low audio output is required for monitoring purposes and losses with incorrect impedance transformers can be accommodated.

Q5 must have very low collector-emitter leakage otherwise the oscillator will be activated with low audio output in the key-up condition.

With key up, —50 volts is applied through a 1 megohm resistor to the base of Q4 and turns this transistor on. This condition turns Q5 off and so prevents the audio oscillator from operating.

As a guide, the voltages to be expected at the various parts of the circuit are shown. The unboxed figures are for key-up, while the boxed figures are for key-down conditions.

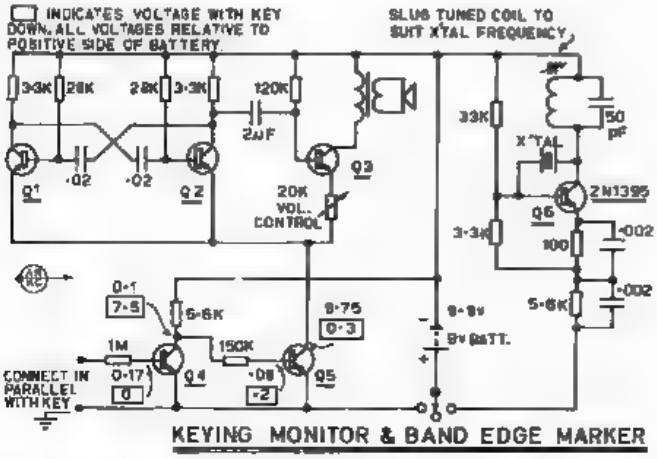
The current demand at 9v. is 1.5 mA. for key-up and 8 mA. for key-down.

One advantage with this circuit arrangement is that if the transceiver is switched off, the loss of —50v. from the input activates the oscillator to remind one to switch the monitor off.

The unit is built into a box just large enough to take a 4-inch speaker. In addition, a band edge marker was built into the same box. Sufficient radiation takes place to produce good signals with the box several feet from the transceiver. A 7000 KHz. crystal was used to provide a band edge marker for 7 and 14 MHz.

The one megohm input resistance to Q4 should be quite satisfactory for all transceivers where the voltage on the key is negative with respect to the chassis and less than 100 volts.

* Thistle St., Pascoe Vale South, Vic., 3044



KEYING MONITOR & BAND EDGE MARKER

Q1 Q2, Q3—Any PNP transistors
Q4, Q5—Type 054 (from computer boards).
Q6—2N1935, 2N1224 or similar.

Xtal—3500 or 7000 MHz., depends on coverage of transceiver.

SOME DAY

Breathes there a man, with soul so dead,
Who never to himself has said,
I must never, never, throw this away,
I'll find a use for it some day.

The rusty wire, the odd size nails,
The empty drums, the old fence rails,
He stores them all with air so gay,
Positively sure they'll be used some day.

This shelf is piled with assorted screws,
And bits of leather for mending shoes.
(The shoes have mildewed, furry and grey,
But never mind, they'll come in one day.)

If you add to this he's a Radio Ham,
Your plain old hoarder's an also ran.
The condensers, the valves, the old relays,
They'll all be used, one of these days.

The chassis, the wires, the technical data,
Transistors, connectors, all such dusty errata,
Can fill up the house, but still he will say,
I'll get it to work, one of these days.

If, as well, he reads, and hates to part,
With printed paper, you've made a good start,
Toward screaming fits and hair so grey,
Whenever he says, "It'll be handy some day".

With cameras, telescopes, books, rocks and maps,
The stuff's piling up, it'll soon reach our laps;
As the floor disappears, I'll soon be at bay,
Menaced by the things that will come in some day.

The future is grim, his son is the same,
With cars, trains, wire, nails, stamps, bits of old games.
With anguished clutching, he will also say,
You can't throw that out, I'll need it some day.

When mothers give counsel to daughters so young,
The praises of handymen loudly are sung.
For reasons obscure, they never do say,
"Beware of the man who will 'use that some day'."

They say, get your man a hobby or two,
But what if the man with some hobbies gets you?
You will wish he had not, when again he does say,
I'll knock up some shelves for it all—some day.

No doubt there are others with menfolk like mine.
Resignation has grown, but at odd times I pine,
For a man who could sometimes, cheerfully, say,
All this old junk? Throw it away!

—S. Gillespie.

— · · · —

NEW N.Z.A.R.T. AWARD—5 x 5

This Premier Award has been instituted to recognise the increasing interest in five-band operation. The initial certificate can be obtained after contacting the SAME station on five different bands, repeated with other stations in four different D.X.C.C countries. Endorsements are available for ten D.X.C.C. countries and then each further ten to one hundred when the ten available endorsements will have been won.

The award, which consists of a most attractive coloured picture (specially selected as appropriate for this award), requires a certified list of stations worked (with essential QSO data) and a fee of $1 which includes the issue of all endorsements after qualification.

Applications to N.Z.A.R.T. Awards Manager, ZL2GX, 152 Lyrton Road, Gisborne, New Zealand

N.B.—Initial award requires five-band operation with five different D.X.C.C. countries. First endorsement after a further five has been contacted (making a total of 10), the 20 endorsement requiring a further 10 and so on.

AWARDS

Malanje Centenary Award is issued for working CR6MG plus one other Malanje station on c.w during the period Aug 3 to Dec. 31, 1970, on any band between 7 and 28 MHz. Other Malanje stations are CR6BY, CD, EP, GQ, GW, HQ, JY, KB, KZ, LC, LK, IN, MG and NS. Logs plus QSLs to L.A.R.A., Concurso Centenario de Malanje, Caixa Postal 86, Malanje, Angola, P.W.A. This one is also available to S.W.L's.

LX Award for working stations since Jan. 1, 1951. GCR list including full log data plus 10 IRCs to LX1AJ. VK ops. would need 20 points, one point being awarded per LX station per band on 20, 15 and 10, with two points on 40 and 80. A five-band QSO would count as 15 points. Not an easy one, but you have a lot of back log sheets to travel over.

A Heterodyne Transmitter for Six Metres

PETER COLLINS, AX3ZYO*

There may be some who will wonder why an Amateur living in a primary t.v. area with Channel 0 is interested in building a 6 metre rig, but those who have been able to work a few 6 metre openings will agree that 6 is definitely the fun v.h.f. band.

Although t.v.i cannot be eliminated, a rig can be designed that will allow operation at most times. Even though a high power rig may give "loudest signal on the band" reports, this may not go down very well with the neighbours—low power operation on the other hand will cut t.v.i. troubles to a minimum and allow a few contacts to be made during band openings at times when Channel 0 is in operation.

This rig has been designed so that the exciter as described can be modulated and used as a low power rig or as an exciter for a high power final which can be used during non-television hours.

For best stability heterodyning was chosen in preference to a conventional v.f.o., which uses a low frequency oscillator to obtain stability, and is then multiplied to the required frequency and at the same time multiplying the drift. Heterodyning is the sum or difference of the two signals and the stability of the output is essentially that of the combined oscillator.

CIRCUIT DESCRIPTION

The 12AT7 crystal oscillator uses a series resonant 18.777 MHz. crystal and is capacitively coupled into the mixer cathode.

The variable oscillator is a receiver type circuit with the second half of the 12AT7 used as a cathode follower to provide isolation and is capacitively coupled into the mixer grid; the output of the oscillator is 2.331-4.331 MHz.

The mixer input coupling condensers are chosen in value to provide the correct level of injection for best output, and minimum output of spurious signals

The mixer tube is a 6AK5 and the output is the difference of the two oscillators (56.331 — 4.331 MHz.). It was decided to place the crystal/multiplier frequency above the desired frequency to avoid the possibility of interference from this signal; if the crystal oscillator was below the desired frequency it would be around 48-49 MHz. (depending on the v.f.o. frequency range chosen) and interference from this signal may result.

Link coupling from the mixer to the E180F r.f. amplifier was originally tried in an attempt to bandpass this circuit, but instability of the r.f. amplifier resulted and was subsequently changed to capacitive coupling, which eliminated this effect and still provided satisfactory operation. Both the E180F and 12BY7 r.f. amplifiers are quite conventional and employ capacitive coupling.

Two stages of amplification were tried in the original design, but it was necessary to run the stages beyond the correct ratings and the inclusion of another stage was necessary. A QQE03/12 was chosen, allowing the preceding stages to be throttled back yet maintain drive over a greater range.

The 3/12 was chosen as it is internally neutralised and can provide the necessary output required for low power operation; the output butterfly capacitor is of 522 origin

A power supply is incorporated in the unit and supplies 150v. regulated for the oscillators, 275v. for the mixer and E180F r.f. amplifier, and the heater supply.

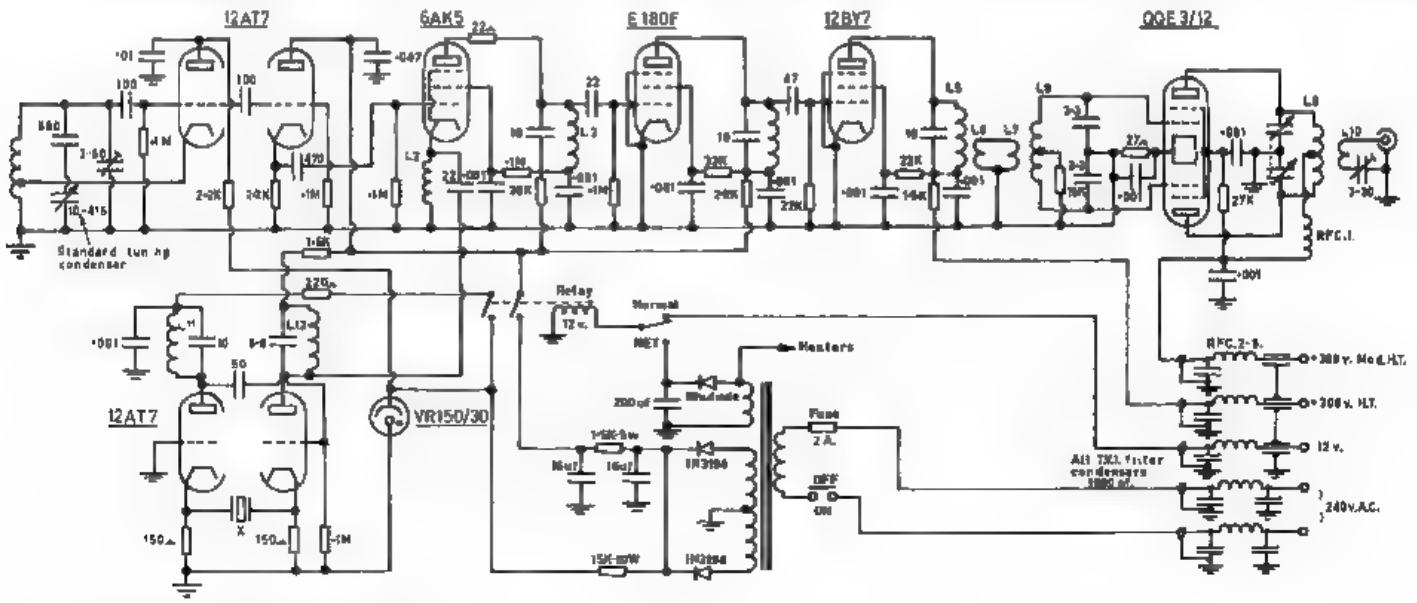
Netting is achieved by energising the relay (RLY) which connects h.t. to the crystal oscillator/multiplier, mixer and r.f. amplifier, the variable oscillator is operative at all times. In the transmit mode, 300v. is supplied to the 12BY7 and 300v. modulated to the 3/12, the relay is also energised. These voltages are supplied from external supplies.

All wiring in the unit is run in screened cable and bypassed at both ends, external connections to the unit are decoupled with feed-through condensers and r.f. chokes in a pi network to prevent radiation from connecting cables.

ALIGNMENT

The first requirement is to ensure that the crystal oscillator/multiplier is adjusted to the correct harmonic, as checked with a wavemeter, then the variable oscillator should be checked to ensure that it covers the required range —the lowest frequency is set by the trimmer across L1 and the tuning range set by the condenser in series with the variable tuning condenser. The next step is to couple a wavemeter to the mixer anode coil and adjust for an output at 52 MHz. Output may also be obtained at the sum of the two oscilla-

* 28 Taunton Avenue South Oakleigh, Vic., 3167.



F.G. 1 HETRODYNE TRANSMITTER CIRCUIT.

tors (60.66 MHz.) and the correct frequency should be carefully chosen.

At this stage the output can be heard on a receiver and a search should be made to check on any spurious signals indicating over driving of the mixer, which can be corrected by reducing the value of coupling condenser from the oscillator, some experimenting of the values of the input condensers may be needed to ensure maximum output with a minimum of unwanted responses. The E180F is a high gain tube and the unwanted frequencies are not far down on the wanted one at this stage and it is necessary to ensure that this stage

L8—Air wound inductance (Wm. Willis No. 2-16) 12 turns centre tapped (20 g. 5/8" diam., 16 t.p.i.).
L9—Same as L8, 8 turns centre tapped.
L10—2 turn link, single strand p.v.c. hook-up wire around centre of L9.
L11—20 turns 28 B. & S. enamelled, 3/8" slug tuned former.
L12—5 turns 26 B. & S. enamelled, 3/8" slug tuned former, spaced 1 turn.
RFC1 -1-7/16" winding length, 28 B. & S. enamelled on ¼" former.
RFCs2-6—15 turns 26 B. & S. enamelled, close wound on high value 1w. resistor.

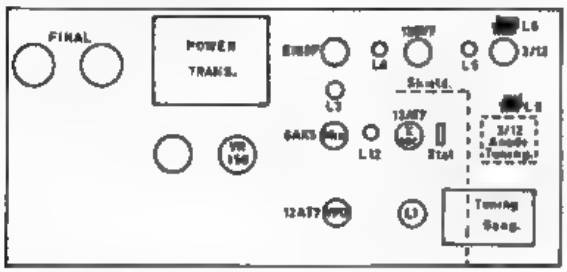


FIG. 2. CHASSIS LAYOUT.

is also tuned to the correct frequency; it is not wise just to tune up for maximum drive to the subsequent stage without checking on the frequency that is being amplified. The 12BY7 driver is tuned for maximum output at about 52.3 MHz.

No attempt was made to stagger tune the stages as the 3/12 can be driven to 2-3 mA. grid current across the range 52 to 53.4 MHz. The grid circuit of the 3/12 resonates at 52.0 MHz. with the 3.3 pF. condensers shown in the circuit, but it would be wise to check this with a g.d.o. and make any adjustments necessary.

All that is required now is to connect the h.t. and a load to the final and adjust the stages for resonance.

The unit is housed in a U-shaped compartment 15" wide, 9" deep and 6" high, which is bolted to a 7" rack-panel, shielding is completed with top and bottom covers suitably drilled to provide ventilation, but maintain shielding, a divider is placed vertically down the centre of the compartment and two sub-chassis are used, one for the exciter and the other for the final and power supply

The final amplifier used with this unit is a push-pull pair of 6146s and when required is connected to the exciter via a co-ax. jumper lead.

COIL DATA

L1—36 turns 26 B & S. enamelled on ¾" former, spaced 1 turn.
L2—32 turns 28 B. & S. enamelled, ¼" former
L3—5 turns 26 B & S. enamelled, 3/8" former, slug tuned.
L4—6 turns 26 B. & S. enamelled, 3/8" former, slug tuned, spaced 1 turn.
L5—6 turns 26 B. & S. enamelled, 3/8" former, slug tuned, spaced 1 turn.
L6—2 turns link on cold end of L5, single strand hook-up wire.
L7—Same as L6 around centre of L8.

CONTEST CALENDAR

3rd/4th October: VK-ZL-Oceania DX Contest (phone).
10th/11th October: VK-ZL-Oceania DX Contest (c.w.).
10th/11th October: R.S.G.B. 28 MHz. Phone Contest.
16th/18th October: R.T.T.Y. Plaque Sweepstakes.
17th/18th: W.A.D.M. C.W. Contest.
24th/25th October: "CQ" W.W. DX Phone Contest.
24th/25th October: R.S.G.B. 7 MHz. DX Contest (c.w.).
7th/8th November: R.S.G.B. 7 MHz. DX Contest (phone)
28th/29th November: "CQ" W.W. DX C.W. Contest.
6th Dec. to 11th Jan.: Ross Hull Memorial Contest.
13th/14th Feb.: John Moyle Memorial National Field Day.

"CQ" W.W. DX CONTEST

PRECIS OF RULES

Bands. 1.8 to 28 MHz.
Exchange: RS/RST plus Zone.
Dates, Phone, Oct. 24/25, C.w., Nov 28/29. Time 0000 GMT Saturday to 2400 GMT Sunday, for both week-ends.
Scoring (a) 3 points between stations on different continents; (b) 1 point between stations on the same continent but in different countries, (c) Contacts between stations in the same country are permitted for Zone and/or Country multiplier but have no QSO point value.
Final score: (a) single band, Zones plus countries multiplied by QSO points; (b) all band, sum of Zones plus sum of Countries multiplied by total QSO points.
Competition Three divisions—(a) single operator, single band or all band, (b) multi operator, single transmitter; (c) multi operator, multi transmitters.
Logs: To "CQ" W.W. DX Contest, 14 Vanderventer Ave., Port Washington, Long Island, N.Y., U.S.A., 11050
Detailed Rules in October 1970 "CQ".

AUSTRALIAN RESULTS 1969 W.W. CONTEST

C.w.—

	Band	Score	QSO	Zon.	Cntrs.
VK2BKM	All	671,884	1180	97	148
VK2GW	All	280,720	548	74	102
VK2APK	14	292,320	830	34	37
VK3RJ	28	13,230	108	18	24
VK3AXK	21	110,960	481	30	30
VK3XB	21	1,408	44	13	30
VK3QI	14	44,808	243	24	40
VK3OP	7	23,048	179	17	26
VK3APN	3.5	6,804	130	11	17
VK4FH	All	113,490	395	42	55
VK4SS	28	16,207	131	24	27
VK5FM	All	141,008	422	40	72
VK5NO	7	87,542	411	38	48
VK6HD	All	316,400	560	70	130
VK6RU	28	118,173	477	26	53
VK6AJ	14	85,004	324	29	62
VK7CH	All	43,014	142	49	56

Phone—

	Band	Score	QSO	Zon	Cntrs.
VK2WD	All	38,790	153	29	61
VK2APK	14	447,282	1030	35	115
VK2BNK	14	12,544	72	23	41
VK3XB	All	12,556	83	30	28
VK3SM	21	12,985	94	21	28
VK4FH	All	339,760	691	65	115
VK4DO	14	28,575	142	27	48
VK4NS	14	4,512	48	16	10
VK6RU	All	1,774,808	1895	105	323
VK6XI	All	69,053	283	51	58
VK6KS	All	110,591	311	54	93
VK3BKM/2 (L. H. Is.)	All	890,756	1338	80	161
VK6RY	All	43,660	288	22	37

A LOW-COST COUNTER

(continued from page 7)

interest in counting, an effective a.c. line filter is suggested. An 086 can be used in place of the AC128.

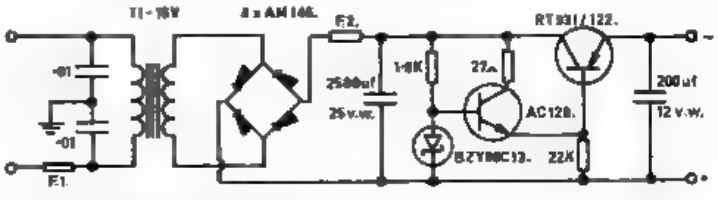
The unit thus far described has been mounted on a breadboard and panel. It is illustrated in the photographs, which show the general layout. This unit was built separately as a counter with a reset facility and will reliably count 4 volt negative pulses at a repetition frequency of some hundreds of thousands per second.

Counting is fun—the run of the count through the lamps is very soothing to watch. On the other hand, it's like having a microamp. meter; you can measure current in microamps. but you can do a lot more with the meter if you make up the auxiliary apparatus. A future article will describe a control unit which permits frequency measurement up to 1 MHz./sec., again using parts from computer boards.

My thanks are due to Dr. B. McMillan for the photographs and Mr. D. Cato for the panel decoration.

REFERENCES

Black, R. H., 1970, Count and Display at $6 per decade. "Amateur Radio," 38, No. 8, 7
Cleary, J. F. (Ed.), 1964. Transistor Manual, 7th Ed., Syracuse, N.Y., General Electric Co.



12V. REGULATED POWER SUPPLY.

THE GROWTH OF RADIO COMM. IN AUSTRALIA

The following figures recently released by the P.M.G. Department are of interest. These figures are the annual returns showing the total of all stations authorised in Australia and Territories as at 30th June, 1970:

Category		Increase during Year ended June 30
Land	10,845	1,579
Fixed	5,601	309
Mobile	113,184	16,565
Amateur	6,238	375
Total	135,868	18,828

It is also interesting to note the following:—

53,551 base, mobile and fixed stations operate between 70 and 85 MHz

29,238 base, mobile and fixed stations operate between 148 and 174 MHz.

865 base, mobile and fixed stations operate between 450 and 520 MHz.

You are cordially invited to speculate as to the further development of Radio Communications in Australia!

—W.I.A. Federal Secretary.

13th JAMBOREE-ON-THE-AIR

The 13th Jamboree-on-the-Air will be held over the week-end of 17th and 18th October, 1970. Starting time will be 0001 G.M.T. on Saturday, the 17th, and the event will terminate at 2359 G.M.T. on Sunday, the 18th. Stations may, of course, operate for any period of time within these limits.

It is suggested that the official World Scout Frequencies listed below be used as calling frequencies only (i.e. for initial contacts only). After contact has been made, the stations concerned should move away (QSY) to continue their conversations.

80-75 Metre band:
3,590 c.w., 3,740 phone, 3,940 U.S.A. phone.

40 Metre band:
7,030 c.w., 7,090 phone, 7,290 U.S.A. phone.

20 Metre band:
14,090 c.w., 14,290 phone.

15 Metre band:
21,140 c.w., 21,360 phone.

10 Metre band:
28,190 c.w., 28,990 phone.

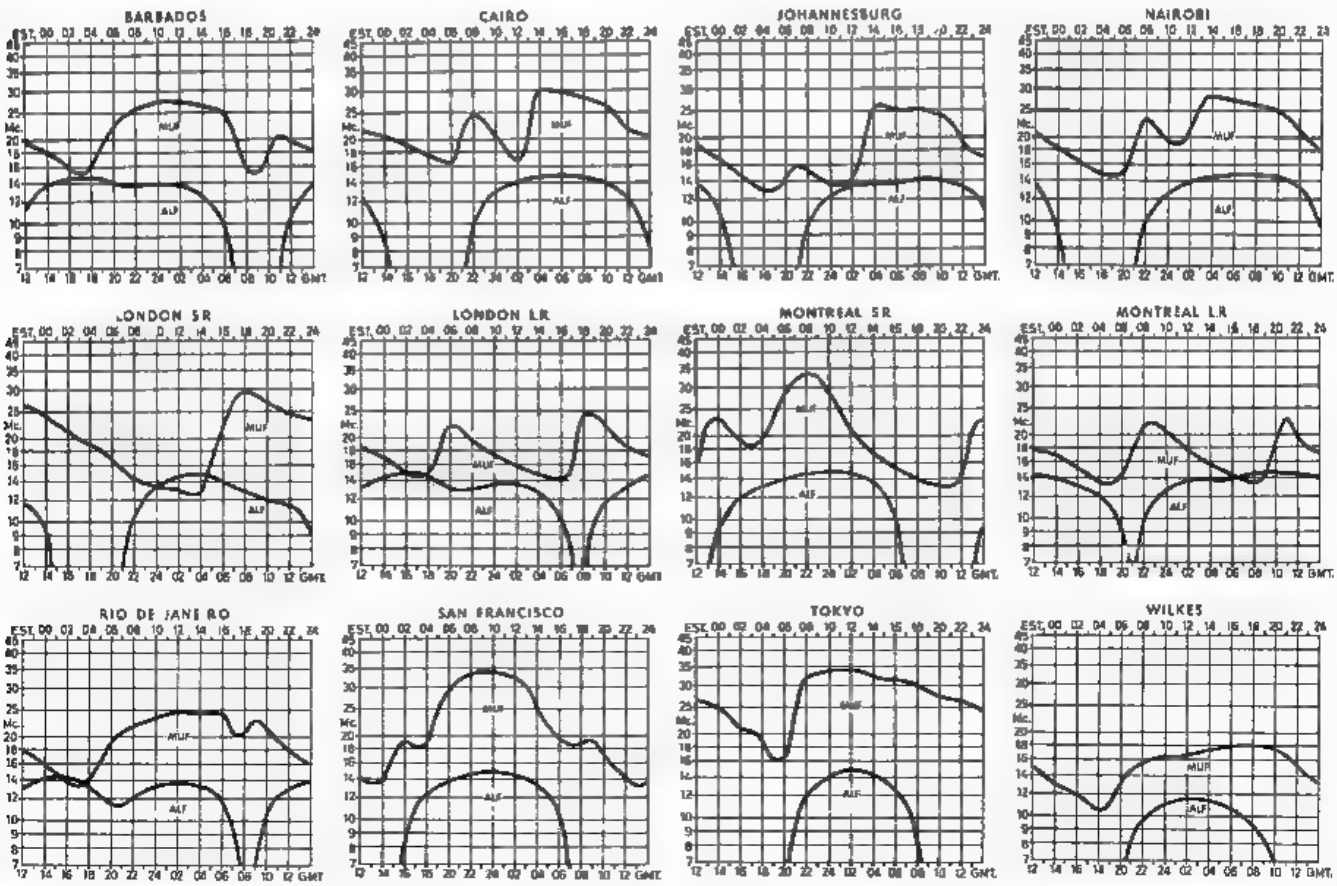
COOK BI-CENTENARY AWARD
V.H.F./U.H.F. SECTION

The following stations have qualified for the Award:

Cert. No.	Call
1	AX2ZNJ
2	AX5ZBT

PREDICTION CHARTS FOR OCTOBER 1970

(Prediction Charts by courtesy of Ionospheric Prediction Service)



NEW CALL SIGNS

MAY 1970

VK1JT J. E. Townsend, 43 Lambrigg St., Farrer 2607.

VK1MF—M. G. Foster, 85 A'Beckett St., Watson, 2602.

VK2IE—R. C. Richards, 288 Main Rd., Thirroul, 2515.

VK2NA R. Choy, 40 Castlereagh St., Concord, 2137.

VK2XI—R. J. Fleming, 52 Belmore St., Bega, 2550.

VK2AAM M. J. Hardy, 8 Juliet St., Charlestown, 2290.

VK2AIX—F. L. Jamison, Jnr., Unit 4A, Thornton Pl., 21 Thornton St., Darling Point, 2027.

VK2ATM A. T. Monck, 27 Park St., Pt. Macquarie. 2444.

VK2ZDE—R. A. Day, 37 Ranclaud St., Booragul, 2284.

VK2ZGB—B. C. Tucker, 4/9 Robwald Ave., Mangerton, 2500.

VK2ZII—I. W. Pietsch, 7/8 Hazelbank Rd., Wollstonecraft, 2065.

VK2ZSB—S. T. Mudge, 32 Willarong Rd., Mt. Colah, 2079.

VK2ZYC—G. D. Vaughan, 4 Lucas Ave., Moorebank, 2170.

VK3EE—F. V. Hughes, 6 James St., Morwell, 3840.

VK3KR—P. K. Bennie, 96 Stawell St., Sale, [redacted].

VK3UV—L. E. Martin, 28 Leura St., Murrumbeena, 3163.

VK3AEA—R. J. Caldwell, 57 Station St., Belgrave, 3160.

VK3AYL—G. R. Boyle, 37 Shakespeare Ave., Preston, 3072.

VK3BAD—G. C. Baker, 32 McMillan St., Clayton, 3168.

VK3BCI—I. C. Beulke, 228 Eleventh St., Mildura. 3500.

VK3BCU—N. P. Muscat, 46 Jackson St., Niddrie, 3042.

VK3BCV—J. N. Cassidy, 8 Brooke Dr., Altona, 3018.

VK3BDD—D. Vassopoulos, 2 Sandgate Ave., Glen Waverley, 3150.

VK3BDM—R. W. Kilgour, 7 Chingford St., Fairfield, 3078.

VK3BDN—R. G. Harding, 5 Marroo St., Doncaster, 3108.

VK3BDY—G. Butterworth, Mickleham Rd., Tullamarine, 3043.

VK3YDD—W. Yunker, 4/50 Lillimur Rd., Ormond, 3204.

VK3YDE—L. A. Gardiner, 10 Lingwell Rd., Auburn, 3122.

VK3YDF—J. E. Falkner, 17 Burgess St., Hawthorn 3122.

VK3YDJ—J. A. Gleeson, 28 Manuka St., South Oakleigh, 3167.

VK3YDK—S. King, 1 Kalmia Ave., Mt. Waverley, 3149.

VK3YDL—L. H. Hazeldine, 3 Grandview Gr., Carnegie, 3163.

VK3YDN—J. F. Bear, 38 Wilfred Rd., East Ivanhoe, 3079.

VK3YDO—A. R. Atkins, 29 Flinders St., East Keilor, 3042.

VK3YDR—N. R. Darragh, 15 Royston St., East Rosanna [redacted].

VK3ZHF R. A. Wright, 10 Culshaw Ave., Clayton, 3168.

VK3ZII—W. H. Lane, 4 Edith Ave., Nunawading, 3131.

VK3ZQP—I. A. Keenan, 15 Grout St., Hampton, 3188.

VK3ZYF—P. T. Cousins, 14 Coleman Rd., Wantirna South, 3152.

VK3ZZA—J. A. Frost, 26 Stanley Gr., Canterbury, 3126.

VK4HY—H. H. Varnes, 3 Leeson St., Bundaberg, 4670.

VK4OE—O. A. Johnstone, 92 Albert St., Inglewood, 4387.

VK4YC—Yeronga Technical College, Station: College Park Rd., Yeronga, 4104; Postal: P.O. Box 45, Yeronga, 4104.

VK4ZCM—S. B. McGregor, 114 Main Rd., Clontarf Beach 4019.

VK4ZCS—C. P. Stubbs, 19 Bradford St., Edge Hill, Cairns, 4870.

VK4ZDY R. J. Hicks, 70 Primrose St., Sherwood. 4075.

VK4ZEB—I. E. Binnie, 21 General St., Hendra, 4011.

VK4ZLK—L. C. Kelso, 46 Gavegan St., North Bundaberg, 4670.

VK4ZWF W. A. Hamilton, Police Station, Neil St., Toowoomba, 4350.

VK4ZYX—N. M. Turner, 12 Market St., Indooroopilly, 4068.

VK5IG R. J. Hester, Station 46 Lambeff St., Ceduna Postal C/o. O.T.C. Control Station. Ceduna, 5690.

VK5AWI—Wireless Institute of Australia (S.A. Division) V.h.f. Group, C/o. J. A. Hackworth, 34 Oaklands Rd., Somerton Park, 5044.

VK5ZBH—M. R. Haskard, 64 Malvern Ave., Malvern, 5061.

VK6FI—A. N. MacTaggart, Station: Meekatharra; Postal: P.O. Box 74, Meekatharra, [redacted].

VK6NA—B. Noseda (Rev. Fr.), Kalumburu Mission, via Wyndham, 6740.

VK6RZ—A. L. Mansfield, Station: U.S. Navcommsta, Exmouth; Postal P.O. Box 22, Exmouth, 6707.

VK6TA—K. A. Thomas, 12 Beresford Ave., Geraldton, 6530.

VK8JM J. P. Meehan, Box 1, Connellan Mess, Alice Springs, 5750.

VK8ZCJ G. G. Baker, Flat 2, Mowbay Flats, Cr. Bennett and McMillan Sts., Darwin, 5790.

CANCELLATIONS

VK1EB—E. F. Bacon. Transferred to Qld.
VK1NC—J. D. Blalock. Not renewed.
VK1ZOL—M. G. Foster. Now VK1MF.

VK2ACW—C. O'Connor. Not renewed.
VK2ADR—J. D. Hunt. Not renewed.
VK2AQG—R. J. Fleming. Now VK2XI.
VK2ASC—J. F. Scougall. Transferred to S.A.
VK2BLH—J. Bays. Transferred to Vic.
VK2BTM—A. T. Monck. Now VK2ATM.
VK2BXK—Rockdale Youth Radio Club. Not renewed.
VK2ZAI—R. A. Isaac. Transferred to Qld.
VK2ZJI—J. F. Davis. Transferred to Vic.
VK2ZQD—R. L. Davis. Not renewed.

VK3AMZ—W. E. Sadler. Not renewed.
VK3ASE—L. E. Martin. Now VK3UV.
VK3BAU—I. C. Beulke. Now VK3BCI.
VK3BCN—C. V. Nelson. Not renewed.
VK3YCA—F. V. Hughes. Now VK3EE.

VK4MX/T—J. R. Martin. Not renewed.
VK4ZVH—H. V. Hunt. Not renewed.
VK4ZVN—V. G. Novotny. Not renewed.
VK4ZZZ—R. G. Crawford. Not renewed.

VK5HG—H. M. Cooper. Not renewed.
VK5LM—R. W. Langford. Deceased.
VK5PR—K. W. Kilsby. Not renewed.
VK5WY—J. F. Westley. Transferred to Vic.
VK5ZWI—Wireless Institute of Australia (S.A. Division) V.h.f. Group. Now VK5AWI.

VK6ZDG—B. Noseda (Rev. Fr.). Now VK6NA.
VK6ZEG—R. W. Godley. Transferred to Vic.

CORRECTION

The P.M.G. Department, Radio Branch, have notified that a mistake appeared in their copy of the January 1970 Call Signs, which were published in June "A.R." The correct call sign of A. J. Jaffrey is VK3YCJ.

OBITUARY

July was a bad month for VK6 Division because we lost two old timers from our ranks.

CLARRIE COOKE, VK6CP

Firstly, Clarrie Cooke, VK6CP, a Life Member of this Division. He first came on the air in the early 1930s using a pair of 46s. His equipment was truly home brew from power transformers right through to r.f. chokes. Like other pre-war Amateurs, he was "rock bound" and a keen c.w. exponent. Clarrie's only departure from home brewing was the purchase of an RA10FA receiver, which he continued to use until going off the air. It was a tribute to the efficiency of his rig and two element beam that he was well sought after by DX stations from all parts of the world.

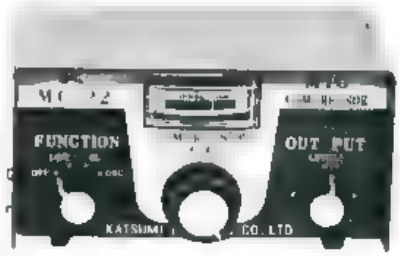
LOU STAGG, VK6LU

The second silent key was L. Stagg, VK6LU. Lou's favourite band was 40 metres, with 15 metres running a close second. A very keen c.w. operator, he often used to remark that "it opens up new worlds, it's like another language." Nevertheless, he was quite active on phone as well and for the last twelve months or so used a couple of bits of JA equipment to good advantage. A friendly fellow who called a spade a spade, Lou was not afraid to get on his feet at a meeting or elsewhere to present his point of view.

The VK6 Division is surely the poorer with the passing of these two gentlemen from the Amateur ranks.

New Equipment

SPEECH COMPRESSOR



A speech compressor, designed for amateur and professional use, which can be used on any type of transmitter, to boost the power of s.s.b. operation, or lift a.m. transmitter modulation, is now available. Designated Model MC-22, the unit is fully transistorised and functions from type 216 or 9v. battery. A built-in audio oscillator provides a signal to adjust s.s.b. transmitters. Price including sales tax is $28. Further information from Bail Electronic Services, 60 Shannon St., Box Hill North, Vic., 3129.

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SEMICONDUCTOR CATALOGUE

A catalogue of semiconductor devices available in Australia has just been released by Radio Parts in Melbourne. It contains 20 pages of compactly printed technical data including functions and prices of semiconductors from Fairchild, Texas, Anodeon, and Miniwatt. Copies may be obtained by written request to Radio Parts, 562 Spencer Street, Melbourne, Vic., or branches at 157 Elizabeth St., Melbourne, or 1103 Dandenong Rd., East Malvern, Vic.

Extracts from "The Calendar" of International Amateur Radio Union

SPACE CONFERENCE

With less than one year until the start of the I.T.U. World Administrative Radio Conference on Space Telecommunications, the need for accelerated Amateur preparatory efforts is acute. The Conference, to be held in Geneva beginning 7th June, 1971, will examine the frequencies allocated to the Amateur Service with regard to the use of space communications techniques. No significant change in frequency allocations is contemplated. However, at stake is the international authority for the Amateur Service to use its allocations for space communications purposes.

There currently exists a footnote to the Radio Regulations specifically authorising transmissions from artificial satellites in the world-wide two metre band. Some administrations take the position that such activity is permissible ONLY in this band. If Amateur satellite transmissions remain limited to 144-146 MHz., the development of Amateur space communications techniques will be unduly constrained. Thus it is an objective of organised Amateur Radio to seek greater freedom for the use of space techniques.

The need for permissive regulations for Amateur space work is felt, perhaps, the greatest in countries having a significant level of Amateur space activity. In other countries, where there is little or no participation in space communication activities, the importance of space allocations may not be sufficiently realised. In fact, some member societies have expressed the view that since they currently have no Amateur space activity, it is not necessary to engage in Space Conference preparations with their government.

Even though a country may have no Amateur space activity, preparation for the Space Conference should not be minimised for two main reasons. First, each member society by urging its government to support the Amateur's position at the conference, will greatly aid the Amateur Service world-wide by gaining additional favourable conference votes. Second, by insuring a favourable governmental position for space activities, member societies will allow for the future development of space activities in their countries. This step of planning for the future of Amateur Radio should not be overlooked.

Initial indications are that the Amateurs' request for more permissive space communications regulations will not go uncontested. In fact, even countries whose attitude toward the Amateur Service is described as being favourable have expressed serious reservations to Amateur space operations. Unfortunately, many nations feel that Amateur satellites should be permitted to operate only in exclusive world-wide Amateur allocations (7, 14, 21, 28 and 144 MHz. bands). The reason behind this view is to protect other services from interference in bands shared with Amateurs or allocated only on a regional basis.

In order to obviate such a frequency restriction, A.R.R.L., joining with the Radio Amateur Satellite Corporation (A.M.S.A.T.) has proposed that we be allowed to operate satellites in all Amateur assignments, consistent with the radio regulations of the respective administrations, provided that an adequate means, such as ground control, is provided to prevent harmful interference to other services, and indeed, to terrestrial Amateur communications. It is felt that the operation of Australis-Oscar 5 clearly demonstrated that Amateurs are capable of controlling a satellite by ground command, and that through this technique, harmful interference to other communications can be effectively alleviated.

This, then, is the essence of the story which should be communicated to the licensing authorities of all I.A.R.U. member societies.

The following are preliminary views of various administrations which have been brought to the attention of I.A.R.U. Headquarters:

Algeria Supports the cause of Radio Amateurs.

Canada The Amateur Service might be permitted to use space techniques only in those portions of the bands allocated exclusively to the Amateur Service on a world-wide basis.

Denmark. The use of satellite technology by Amateurs should be restricted to frequency bands which, in all three I.T.U. regions, have been allocated exclusively to Radio Amateurs.

France Allow Amateurs the use of space techniques only in the bands reserved for the purpose exclusively throughout the world.

Germany Space communication techniques may be used in all exclusive Amateur allocations. If the allocation is not uniform in all regions, satellites can only be permitted if they do not cause interference to other services in the remaining regions.

Greece One hundred per cent. pro Ham Radio.

Kuwait. Same as U.S.

Netherlands No objection to apply the present footnote No. 294A to all bands allocated to the Amateur Service on a world-wide and exclusive basis.

Nicaragua Will support the points of view in favour of Amateurs.

Portugal. Inconvenient to permit Amateur use of space techniques. Should such use be authorised, it should be limited to bands allocated exclusively to Amateur use and with the exclusion of stationary satellites.

Saudi Arabia: Same as France.

South Africa. Same as U.S.

1970 SUMMARY OF ANNUAL REPORTS

Country	Dues $—U.S.	Society Members	Licensed Members	Total Stations	Membership necessary for Licence	Annual Licence Fee	Age Limit	Citizenship Required	Maximum Power	Third-Party Traffic	Emergency Corps	Data Date
Algeria	5.00	250	16	16	yes	5.00	18	no	100	no	no	1970
Angola	—	530	230	230	yes	—	no	no	100	no	no	1970
Argentina	6.85	1,600	1,600	14,000	yes	—	14	yes	1,000	no	45	1969
Australia	3.80	4,430	2,900	6,000	no	2.20	14	yes	150	no	300	1970
Austria	2.00	1,434	1,174	—	no	15.00	18	no	250	yes	no	1969
Bahamas	1.48	30	11	32	—	5.71	no	yes	100	no	yes	1968
Barbados	5.00	—	—	65	—	—	—	yes	500	no	yes	1968
Belgium	7.00	1,230	700	1,200	no	13.00	16	no	500	no	120	1969
Bermuda	5.00	55	36	46	no	3.00	no	yes	150	yes	no	1970
Bolivia	0.46	154	107	107	—	—	no	no	1,000	yes	—	1967
Brazil	6.00	17,273	12,034	12,534	—	—	14	yes	1,000	yes	yes	1968
Bulgaria	0.60	3,955	446	446	yes	0.70	18	yes	1,000	no	—	1969
Burma	2.80	25	20	25	—	2.80	no	yes	150	no	no	1962
Canada	5.50	3,630	3,191	12,061	no	10.00	15	no	1,000	yes	316	1970
Ceylon	2.00	141	36	36	no	3.00	18	yes	150	no	no	1970
Chile	10.00	1,000	650	1,650	no	5.00	15	no	1,000	no	90	1969
Colombia	15.00	350	350	1,000	no	1.00	15	yes	1,000	no	60	1970
Congo	3.00	—	—	—	—	5.00	16	no	100	—	no	1961
Costa Rica	15.00	175	150	400	—	2.00	no	—	1,000	yes	—	1968
Cyprus	1.20	26	20	25	no	—	14	yes	150	no	no	1969
Czechoslovakia	4.00	4,730	1,970	2,250	—	13.50	18	yes	—	yes	—	1969
Denmark	5.00	3,000	4,653	—	no	4.00	16	no	200	no	no	1969
Dominican Rep.	15.00	100	100	600	—	none	—	no	—	yes	yes	1968
East Africa	3.00	113	50	56	no	9.00	no	no	150	no	24	1968
Ecuador	1.88	500	400	350	—	—	18	no	1,000	yes	yes	1968
El Salvador	24.00	97	83	183	no	none	13	yes	1,000	yes	—	1969
Faroe Islands	2.80	24	20	20	no	4.00	16	no	300	no	no	1970
Finland	7.00	3,223	2,000	2,000	yes	—	—	—	200	no	80	1965
France	5.50	8,483	3,230	5,405	no	7.60	18	yes	150	no	—	1970
Germany	10.00	20,261	12,912	15,394	no	9.00	18	no	150	no	no	1970
Ghana	3.27	33	23	26	—	10.00	—	—	150	no	no	1968
Greece	8.00	230	90	95	yes	none	16	yes	150	no	no	1970
Guatemala	1.88	140	130	135	—	—	18	no	1,000	no	no	1963
Honduras	12.00	63	66	150	—	5.00	no	yes	1,000	yes	yes	1970
Hong Kong	5.60	70	40	41	no	3.80	16	yes	150	no	no	1969
Hungary	—	631	631	631	yes	1.00	18	yes	500	no	—	1970
Iceland	5.75	130	40	31	yes	1.10	16	yes	250	no	no	1970
India	2.00	360	220	—	no	3.00	14	yes	150	no	no	1969
Ireland	2.80	222	153	226	no	5.00	16	no	150	no	no	1970
Israel	4.50	550	540	600	no	1.00	no	yes	500	yes	no	1969
Italy	6.40	4,000	2,500	3,500	no	—	18	no	300	no	—	1970
Ivory Coast	10.00	75	30	37	no	20.00	16	no	300	no	—	1969
Jamaica	3.15	65	45	50	no	3.40	no	yes	1,000	no	35	1970
Japan	3.33	41,789	34,339	100,000	no	—	no	no	1,250	no	—	1970
Korea	4.00	350	330	90	yes	6.50	no	yes	500	no	yes	1970
Lebanon	7.80	60	60	110	no	17.00	16	no	100	no	6	1969
Liberia	7.00	55	55	55	yes	10.00	13	no	2,000	yes	18	1969
Luxembourg	2.00	135	94	95	no	2.00	18	no	100	no	no	1970
Malaysia	4.00	79	60	—	no	4.00	no	yes	150	no	no	1970
Malta	2.40	57	23	—	no	4.60	14	no	150	no	no	1970
Mauritius	2.00	30	18	27	no	5.00	16	no	150	no	no	1970
Mexico	3.60	1,002	1,002	2,010	no	2.27	—	yes	1,000	no	350	1970
Monaco	2.00	22	19	19	no	no	16	no	100	no	no	1970
Morocco	4.00	80	80	80	no	4.00	18	no	100	no	yes	1970
Mozambique	10.00	220	200	221	yes	10.00	—	yes	100	no	yes	1970
Netherlands	8.00	3,286	1,700	2,100	no	6.00	16	yes	150	no	no	1970
Netherlands Ant.	7.50	30	25	68	no	7.00	16	yes	1,000	no	no	1970
New Zealand	4.20	2,250	1,786	2,985	no	3.60	14	yes	150	no	350	1970
Nicaragua	18.00	210	120	200	yes	none	no	no	2,000	yes	yes	1970
Nigeria	2.80	45	8	8	no	5.40	14	no	150	no	no	1970
Norway	7.00	1,641	1,247	2,613	no	2.80	16	yes	150	no	no	1970
Panama	12.00	146	134	170	no	none	no	yes	1,000	yes	25	1969
Paraguay	8.00	134	134	134	no	4.50	no	yes	1,000	yes	yes	1969
Peru	1.25	481	470	1,627	—	2.15	no	yes	1,000	yes	yes	1965
Philippines	2.50	97	47	151	no	2.50	15	yes	1,000	yes	10	1970
Poland	5.00	5,000	2,954	3,234	yes	none	15	no	750	no	—	1970
Portugal	6.30	700	400	500	yes	7.00	16	no	400	no	no	1969
Rhodesia	2.78	207	197	198	no	5.56	16	yes	150	no	—	1969
South Africa	6.50	1,883	1,336	2,200	no	1.50	16	—	150	no	no	1970
Spain	8.60	2,938	1,120	1,120	yes	—	18	—	50	no	—	1970
Surinam	3.50	48	48	46	no	2.88	18	yes	150	no	—	1968
Sweden	10.00	2,850	2,300	3,423	no	5.50	14	yes	500	no	no	1970
Switzerland	8.15	1,468	790	917	no	14.00	15	yes	150	no	—	1970
Syria	3.50	25	13	14	yes	8.50	18	yes	500	no	no	1969
Trinidad & Tob.	2.50	53	31	40	no	7.20	18	yes	1,000	yes	yes	1969
U.S.S.R.	2.70	114,000	5,000	15,000	no	none	16	yes	200	no	no	1969
United Kingdom	6.50	16,000	7,200	15,310	no	7.50	14	yes	150	no	yes	1970
U.S.A.	6.50	21,573	77,007	205,000	no	0.00	none	yes	1,000	yes	yes	1970
Uruguay	2.40	1,200	1,100	3,500	—	none	16	no	350	yes	yes	1965
Venezuela	53.32	1,250	1,250	3,000	—	22.50	21	yes	1,000	yes	yes	1958
Western Samoa	7.14	10	6	7	—	4.50	14	yes	150	no	no	1969
Yugoslavia	0.50	30,000	1,750	1,750	yes	—	16	yes	500	no	—	1970
Zambia	2.38	43	40	54	no	2.38	18	no	150	no	—	1970

Sweden Supports Amateur satellite operations in exclusive Amateur bands with the exception of the use of geostationary satellites.

United Kingdom, Amateur space communication may be allowed in exclusive Amateur allocations. However, the U.K. is agreeable to space communications in shared allocations at 432 and 1296 MHz. provided that there are safeguards and that the onus of avoiding interference lies with the stations of the Amateur Service. The safeguards discussed included the provision of telecommand facilities and the possibility of a limitation of the power flux density at the earth's surface.

United States' Space communication techniques may be used by the Amateur Service on all allocations within the limitations imposed by the table of frequency allocations.

What is there to be done? Each I.A.R.U. society should, if not already accomplished, inform its licensing authority of the needs of the Amateur Service for the forthcoming conference. This is a very important step since the views of administrations will be determined prior to the actual conference in Geneva. I.A.R.U. Headquarters will offer assistance, where appropriate, to member societies in preparing their presentations about the space conference to telecommunication officials. Please keep us advised of your efforts, and let us know whenever we can be of assistance.

I.A.R.U. REGAINS I.T.U. OBSERVER STATUS

For many years, I.A.R.U. has been on a list of organisations permitted to send observers to International Telecommunication Union conferences without financial contributions to expenses of the meetings. At the I.T.U. convention held in Montreux in 1965, there was adopted a Resolution No. 16 which instructed the Administrative Council of I.T.U. to review the list of international organisations exempt from all contributions. This resolution was adopted because it was felt that the number of international organisations who were permitted to participate in I.T.U. meetings without making any financial contribution had grown too large.

This instruction was carried out by the Administrative Council in 1968, when it reduced by half the number of exempt organisations. The International Amateur Radio Union was one of those removed from the list.

Recently, I.A.R.U. Headquarters, with the assistance of a number of member societies, requested re-consideration by the Administrative Council of our status as an observer organisation at international conferences. We are happy to report that this request has been approved, and the observer status of I.A.R.U. has been re-instated on the list of those exempt from financial contributions. **[It is interesting to note that the resolution for exemption was moved by the Australian Delegate.—Fed. Sec.]**

FREQUENCY MANAGEMENT SEMINAR

Biennially the International Frequency Registration Board of the International Telecommunication Union holds a frequency management seminar at its headquarters in Geneva, Switzerland. This year's seminar is to be held from 7th to 18th September, and as in past years I.A.R.U. Headquarters will be represented by W1IKE.

The Frequency Management Seminar is aimed at assisting administrations, particularly in the developing countries, more efficiently to manage their use of the radio frequency spectrum. Thus, a good opportunity is provided for representatives of the Amateur Service to meet with telecommunications delegates from other countries for the purpose of increasing the awareness of the values of the Amateur Radio Service.

1970 SUMMARY OF ANNUAL REPORTS

The accompanying table presents a summary of the information provided in your 1970 annual reports. Where an annual report was not received for 1970, information from the latest report received is provided.

REGION II. MEETING

Fifteen national Amateur organisations of North and South America, represented by twenty-two delegates and observers, participated in the 1970 triennial Conference of the Union Interamericana de Radio-aficionados—I.A.R.U. Region II., May 18-22, in Jamaica. The host society was the Jamaican Amateur Radio Association; during the week, a conference station with the special call 6Y0UIR was in operation and made hundreds of contacts.

In opening remarks, I.A.R.U. President, W0DX, emphasised the importance of Amateur preparation for the 1971 World Administrative Radio Conference on Space. He pointed out that in the same manner that organised radio has protected its h.f assignments in the past, it must now work for the protection of our interests in the higher frequency and their use with space techniques.

The Caribbean Emergency Net has been a major accomplishment of the Region II. organisation. This operation functions under the expert guidance of XE1AX and 6Y5EM. It was decided that expansion will be undertaken to cover portions of South America.

Slight amendments were made in the "gentlemen's agreement" plan for use of frequencies. This basic band plan now provides that 3500-3510 and 3790-3800 KHz. be used only for international DX contacts, that r.t.t.y should use 14090-14100 and that 14190-200 as well as 21240-21250 should be reserved for DX work.

A contest sponsored by the Region II. organisation has been attempted for the past two years. But, because interest was small, it has been decided to discontinue the activity and study a possible alternative event to promote general Amateur interest in work of the region.

Finally, it was agreed to accept the proposal of the Radio Club de Chile to hold the 1973 Conference in that country.

EARTHQUAKE IN PERU

OA4A, the headquarters station of the Radio Club of Peru, performed outstanding service during June, handling emergency communications traffic resulting from the massive earthquake which devastated portions of Peru on May 31, 1970. OA4A was operated around the clock, largely on 7100 KHz., working other OA stations who were able to relay traffic from the areas of need.

This operation was observed first-hand by a representative of I.A.R.U. Headquarters. W1IKE spent two weeks in Peru during June as a member of the Andean Relief Mission, a group of mountain climbers and doctors who, organised under the auspices of the American Alpine Club, flew to Peru in order to render assistance. W1IKE set up OA3H in a remote mountain area which had been hard hit, and handled a considerable amount of traffic between his group and Peruvian officials in Anta and Lima, thanks to the excellent assistance provided by OA4A. The Radio Club of Peru is to be congratulated for having organised this emergency communications activity in the finest tradition of the Amateur Service.

I.T.U. ANNOUNCES CONFERENCE DATES

The Administrative Council of the International Telecommunication Union has plans for holding the following conferences: The World Administrative Conference for space telecommunications scheduled to begin 7th June, 1971. The I.T.U. Plenipotentiary Conference will be held in Geneva, starting 14th September, 1973. And, the next World Administrative Radio Conference for maritime services will be held early in 1974. At the present time, no conference dealing with allocations throughout the h.f. spectrum has yet been scheduled.

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GOING TO WASHINGTON?

The Foundation for Amateur Radio, Inc., a non-profit institution devoted to advancing the interests of Amateur Radio with its headquarters in Washington, D.C., announces the establishment by it of a Hospitality Committee with the objective of providing visiting foreign licensed Radio Amateurs with an opportunity to meet some of our local active Amateurs and, if desired, visit a local Amateur Station.

Any visiting foreign Amateur can get in touch with the Hospitality Group by calling (202) 893-8383. It will be appreciated if calls are made during the hours from 0800 to 2000 daily.

Arrangements can be made to greet the foreign visitor and to give him an introduction to our capital city as well as to Amateur Radio U.S. style.

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WM. WILLIS MOVES

Established over 115 years ago, one of Melbourne's oldest firms, Wm. Willis & Co. Pty. Ltd., moved recently to 77 Canterbury Road, Canterbury, 3126. The new location will provide easy parking facilities and better service for customers. Manager Mr. Max Hull advised "A.R." that a change in the merchandising policy of the company was to develop a trend to fast and efficient mail-order despatch, and a general distribution of a special range of equipment and components of interest to Amateurs, in addition to its well known operation of manufacturing special components for the communications industry. The new telephone number is 836-0707, where Mr. Max Hull may be contacted during trading hours.

Overseas Magazine Review

Compiled by Syd Clark, VK3ASC

"BREAK-IN"

July 1970—

N.Z.A.R.T Conference, Dunedin 1970, ZL4PG. According to the report every one enjoyed themselves

A Two-Terminal Oscillator, ZL2AMJ. Two FETs in the eqiuvalent of the old twin triode-cathode coupled circuit. A very handy type of oscillator. Add your tuned circuit and you are "on frequency"

Some Observations of Mobile Antennas, by ZL2VN. VKs who are preparing themselves for some summer mobile operation should be interested. You cannot fit and forget a mobile whip. It must be tuned for optimum results.

Digital Frequency Counter, Part 3, ZL2BGP. A four-digit counter using ICs. There is no reason for an Amateur to require more than four digits as he can display MHz., KHz. or Hz. as the need arises, knowing what is off-scale.

Otago Branch Project. S.S.B. Exciter, 9 MHz. Phasing Type, Part 3, ZL4LV.

"CQ"

June 1970—

Model Control by Radio, W2SI. This two-part article covers the history of radio control systems of models and the present day controls. Much of the early work done in the area was accomplished by Amateurs as the control system was operated in the old 5 metre band. Part 1 covers history and development and Part 2 will cover present day techniques and equipment.

The Two-Gallon Cavity, W2EAG. Hailed as the cure for six metre t.v.i. This article appears to be one which will be hailed by those who like to operate on six in Melbourne and Brisbene. The magic potion is two paint cans, two connectors, two juice cans and one small capacitor.

C.W. Spotting with the HWM-2, WB4JSV. Seems that someone has found a way of improving one of the best. The best today can always be bettered tomorrow

The ARC-500 Linear, WA9UTP. He uses the case and the roller coil and fits in a power supply, three 6JE6s and a pi network and the thing then runs 500 watts input

An Eighty Metre Dipole, WB2GQY. This 80 metre dipole can fit in sixty five feet of space and will also load on 40, 20, 15 and 10 metres. Seems like an Indian nylon rope trick to me!

Variable A.F. Bandwidth for the HW-100, W6ZOL. Good c.w. mod.

Transistor Reverse Polarity Protection, Ronald L. Ives. The diode is a handy switching device.

A Receiver Audio Compressor, W1CEJ. A lazy man's gain control.

Convert S.W.R. into Watts, K8ZVR. Or turning the s.w.r. meter into a "thruline" wattmeter.

Improved Performance from the No. 19 Set, W6JTT. The author converted a Number 19 Mark II. He claims excellent results on three bands

Alfred Vail, the man behind the Morse Code, K2EEK. It would appear that many of the stories which now appear in the history books are heavily slanted in favour of those who held the power and are not necessarily correct.

This writer asserts that Morse managed to operate an indicator at a distance, but it was not until Vail happened along that he could send messages

Could the Licensing System be used to Improve the Overall Performance of U.S. Amateurs, K4IIF. Obviously the title says what it means, I wonder though, whether the slops should really appear between the U and the S.

Calibrate Your Own D.C. Meters. K3STU. Part 2. Part 1 discussed the theory of the potentiometer and volt box. Part 2 covers the principles of the Standard Resistor, the construction techniques for all three units and their application.

"CQ" Review the Heathkit SB-220 Linear Amplifier W2AEF. If you are thinking of buying one you will be interested. If you have one you will want to read it to see if you agree.

Surplus, The AN/PRC 10. Now some of the transistorised units are appearing on the surplus market.

July/August 1970—

The very heading will give W2NSD/1 a thrill. So "CQ" have dropped to 11 issues instead of 12.

Transistorised Communications Receiver with Digital Frequency Read-out, PY2EIC. From 1965 a receiver building programme commenced and some twenty-eight have been built. No. 28 is described.

Solid State Current Regulators, W4NVK. For those who need regulated voltages.

Something for Nothing C.W. Filter, W6HPH. Tune the primaries of two output transformers after removing the laminations from both of them and couple them electrically and you have a filter.

A Ten and Fifteen Metre Interlaced Beam, W4AXE. The title tells you.

Understanding Skin Effect, W4NVK. The cause and the results of skin effect. The coverage is non-mathematical and is ideal for novices, beginners of all types from 15.

Model Control by Radio, W2SI, Part 2. Now the thing is proportional control. This allows precise control of the model and eliminates a lot of the violent actions which used to be inherent in model operation.

"CQ" Reviews the Hallicrafters SX-122 Receiver, W2AEF. Seems that even in these enlightened days much of the communications equipment made still uses those old fashioned, unreliable, heat producing valves.

A Two Metre Cavity Filter, W6QLB. This guy was not satisfied with one co-axial element, he had to put three trough lines in cascade.

"OHM," The Oriental Ham Magazine

This issue carries an exciting story about the search and rescue operation on behalf of the yacht "Exodus" 36 ft. long and carrying Jens Jensen, W4AMG/MM and his wife Keiko. Hams, Navy and R.A.F. were involved in the Guam area for 48 hours before the yacht was located and fuel supplied.

All-India Convention. A report on the activities in India and the manner in which the Indian Government is encouraging Amateur activity.

Mars in Asia, VS6DR. The story of the U.S. Military Affiliated Radio Service in operation in the Orient.

Tribute to a Veteran. Story of FL1HR.

Ham Profile, VS6EK.

Lincompex, VS6DD. A speech compressor is described which claims to have all the advantages and none of the disadvantages of the others.

"QST"

July 1970—

W3JK Five-Band Rotary Beam Antenna, by W3JK. Professor Kraus has taken one of his classic designs and by putting two vertically polarised units together, made it into an all-band antenna.

The 70 Communicator, W1KLK. Updating a popular v.h.f. transceiver

A Silicon Diode P.I.V. Checker, WA4DID. A simple device which enables you to check surplus diodes for P.I.V. up to 2 kV. The thing that puzzles me is why the designer didn't use a Varine on the input. Perhaps because he had the 50 w. pot. on hand I guess.

Power Line Interference, W4USQ. This article reviews the causes and characteristics of power line noise.

The Ultimate Transmatch, W1ICP. From 80 through 10 metres, co-ax, or balanced Line, it matters not, this unit will match it.

Let's Talk Transistors, Part 9. Operating transistor circuits by R. E. Stoffels. Some practical audio amplifier circuits and a flip-flop are studied from the standpoint of overall circuit operation.

Eclipse Experiment—1970, W1JF. What happens to radio signals during an eclipse?

The Solid State Receiver, W0IYH. Design problems and their solutions for high performance.

Some Basics of Solid State Design, W1CER. A practical introduction to the three-legged devices.

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DARWIN RADIO CLUB

With only a small membership, about 25—and therefore limited funds, this club has done wonders. It has its own premises at Lee Point in the old Fortress Area and is proud of being what is probably the only radio club in the world guarded by two six-inch Coast Defence guns. Years of unrelenting battle with officialdom was necessary to secure the lease and have the 240 volts a.c. connected. Also much work to clean out the mess left by vandals, paint the interior and install work benches. There is much more to be done—dismantling old gear and salvaging components, etc., and working bees are being organised.

The first meeting at Lee Point was held on 3rd August at the Clubroom—it turned out to be unconstitutional as that day was a holiday in Darwin, but much useful discussion took place. A fortnight before, the Clubroom had been "christened" with a very pleasant barbecue for members and their wives and the official call VK8DA used for many QSOs. Basil VK-8BB loaned his Trio transceiver and a make-shift 20 metre dipole showed what a good location it is.

The meeting was slightly disturbed by car-loads of lovers driving into the clearing and glaring balefully at the members before moving off. It is located slap bang in the middle of one of Darwin's favourite Tail Light Alleys.

The club is almost ready to go with a solid state 52 MHz. beacon designed and built by the members. A small but enthusiastic bunch and any Amateurs visiting Darwin on the first Monday of the month will receive a warm welcome. Just don't get lost on the tracks out to Lee Point. You may never be found again. Phone Basil Brodrick, VK8BB, Henry Anderson, VK8HA, or Doug McArthur, VK8KK, they will give directions.

DX

Sub-Editor: DON GRANTLEY
P.O. Box 222, Penrith, N.S.W., 2750
(All times in GMT)

Once again a varied range of conditions for the month, with some of the best being found on 10 metres over the last few days of August. Latest sunspot forecast is 87 for September and 85 for October, with 108 for April being the latest confirmation.

A further comment re the station giving the call ZM7CA, giving ZL2ACI as his QSL manager. The operation is rather dubious, as ZL2ACI disclaims any association whatsoever in the matter and is most anxious that the DX fraternity be advised accordingly.

Regularly information comes to hand here about some new club or DX association, and were I to delve into the workings of them all, I would never get this page completed. However, one has been mentioned recently which I feel warrants some little coverage. It is the International DX Association, a body whose sole objective is to furnish Amateur equipment to anyone contemplating a DX-pedition. They have been instrumental so far in having rigs sent to many rare spots such as OH2BH/ZA, ST2SA, ZK1MN, ZK2AF and ZM7. Officers are WA3REU, W3DJZ, K3RLY and PY2PE. A sub. of two dollars U.S to B. Kellam, 5536 A..view Dr., Ellicott City, Maryland, 21043, U.S.A., whom I presume is K3RLY, will make you a member and assist their efforts. They have a net on 14218 at 2330z daily.

A fine year of operating by Peter ZM3CQ has resulted in him receiving his five-band D.X.C.C. from the A.R.R.L. He leaves ZL for a period of about 10 months which will be spent in London.

My thanks to Don AX3AKN for a very welcome list of QSL information which will be included at the end of this page. Don is flat out at the present moment, but still manages to put in an appearance on 21 and 28 c.w., also 1.8 c.w., where he has had several contacts into the U.S.A.

I understand that the African DX net has recently been activated with WB6UDC and K6ZF1 as net control pending the re-erection of W4SPZ's antenna. The Long Is. DX Assn. bulletin mentions the fact that 5X5MP was in the first list of operations, and XT2, TT8 and TY2 stations will be in later nets. There is no further information in relation to time and frequency for the net, and I would appreciate any word on this. The 5X5MP station, by the way, is Sverre, a YL, and her QSLs go to the home QTH LA8ML.

The operation from Andorra by C3ICY with eight ops. was due from Aug. 13 to 31. QSLs for this effort go to DL8LK, Wilfred Ahlborn Haupstr 30, D-3401, Hollensen, Germany.

There have been some vague stories about the planned operation from CE6K and CE0Z, but the reliable Geoff Watts DX News Sheet states that CE3ZN Joaquin will join with Gus W4BPD in November working four days on San Felix, followed by six days from Juan Fernandez.

CR5SP from Sao Tome is on regularly at 1730z on 21248 KHz., listening 21280/290. A list is taken a little earlier by CR6CA. QSLs to Box 97, Sao Tome, P.W.A.

Recent operation by CR3AK, operator Reg, asks for his QSLs to go to CT1BH. I understand Reg, who is on a tour of the Orient, has permits for operation in VS5, 9N1 and possibly the Laccadives. Reg is VE7IG.

At last somebody had had the foresight to organise the FB8WW, XX, YY and ZZ boys. They are now in a net every day at 2230z from Aug. 17, with lists being made up on 14218 at 2200-2230 for contacts the following evening. FB8YY is heard regularly here at around 1600z on 20 c.w.

From Comoro Is. we note that FH8CD has returned to France for the next two months, however FH8CY who is ex-TG9GL, is holding the fort, and appearing quite often on 21225 at 1700z. Little use for us at that time I guess.

Martinique has long since ceased to be a rare one, nevertheless he remains an interesting catch and can be found on 21280 at 1700z on schedule with W4OPM Tuesday or Wednesday each week. Once again a bit early for VK. FM0XF is also on regularly and asks for QSLs to go via DL5HI whose address is Pierre Guannel, 1 Berlin 52, Cite Berthezene 44/2, Kurt-Schumaker Damm, Germany.

Recent operation by FW8BO, Tom from Wallis Island, has been rather prolific. He is often on 14187 or thereabouts at 0400z or later and he QSLs via FK8BO, Box 28, Noumea, New Caledonia.

GC3UJE, who has been operating this month and who has been heard in this country at around 0300z, is operating from Guernsey. His name is Brian and QSLs for him go to G3UJE.

A Japanese possession net is in operation on Saturdays at 2000-2100z on 14170. This will give information on future operations by the JD1 stations and as many as possible will be in the net. Most of these chaps ask for QSLs to go via the J.A.R.L.

KH6GLU, Ed de Young, well known as net controller of the Pacific DX net, now has a new address which is 95213 Waimeli Place, Waipio, Hawaii, 96786. He is also QSL manager for ZK1AJ, FW8DY, VR3DY, KR6AP, ZK1MN, KX6BK and 5W1AF.

The recent operation to Swan Is. by K5QHS was successful and all QSLs are to go to his home address, Box 588, Stuttgart, Arkansas, U.S.A. The other operation by W4VPD terminated in a hurry when the final blew.

The following stations are active from the MP4 call areas. From Bahrain, MP4BHK and BIJ, from Qatar we have MP4QBK, his manager is W4MQG, whilst from Trucial Oman MP4TDI and TDA are holding the fort.

There seems to be a lot of criticism on the current operation by Gus Browning, both over the air and in the news sheets. Personally it does not affect me in the slightest, and if Gus doesn't stick to a tight schedule, that's his business and there must be a good reason for it. He is giving a good service to a lot of people and if one has to hunt around the bands looking for him I should imagine it would add a little interest to what has degenerated into a too well organised affair.

We still have a number of VR stations active. Bob VR1L is on from Ocean Is., QSL to W6NJU. KP6AL was expected to appear from VR3 Fanning Is. for a few days, while VR4CG is still holding the fort from the Solomons. His address is Box 310, Honiara, Solomon Is. VR2SA QRV Sept. 6 to 10 was a special Scout station from VR2EK. Another active from the Solomons is VR4BC, Box 333, Honiara.

Current operation from Cayman Is., due to cease Sept. 6, has a goal of several thousand QSOs. This is the jaunt by K8QFZ and K9RJP, who were hoping for five-band operation. They ask for QSLs to Melvin Lehman, 3951 Albion, Lincolnwood, Ill., 60645, with SASE or SAE and IRC. The other two operations were K2OLS using the call ZF1AA, and ZF1GC operation, whose QSLs go to VE4XN.

L.I.D.X.A. bulletin states that ZS2MI on Marion Is. has shut down with equipment trouble and estimates that there will be no further activity from there until May of next year.

The new prefixes for the Mauritius area are 3B6 Algalea, 3B7 St. Brandon, 3B8 Mauritius, 3B9 Rodriquez. 3B7DA on St. Brandon is active and QSLs go to Meteorology Station Mauritius, while 3B8CZ is active from Mauritius.

The station signing FK8KAA with a resounding c.w. signal on 20 most afternoons at around 0600z is the Club station and is on the air daily in fact from 0300z to 1000z, although I often hear him earlier. His frequency is 14040, and address is Box 28, Noumea.

There is once again some activity from the Pelagic Is., two separate operations, the first being IT1XAI/IL Frank, asks for QSLs to IILJ whilst the other group signing IL1GAI, IL1JT and IL1LCK were IT1GAI, IT1JT and IILCK from Lampedusa from Aug. 29 to Sept. 1. Their QSLs go to IT1GAI, Box 12, Noto, Sicily. The same group go to Pantelleria from Sept. 2 to 7.

King Hussien is still with us, usually around the 1700z to 1800z period, however JY2 who is said to be his XYL, Princess Muna, has now appeared on the scene having been reported in the YL s.s.b. net 14332 at 2200.

Look for LX1BW every week-end until the end of October on all bands. There is no QSL info to hand, but I heard him at 0700z on 20 s.s.b. recently. During the week-end of Sept. 3 to 7 he will be signing FO7T.

MIB is still on the air and has a regular period of operation at 1300z and 1600z Saturdays on 21360 when QSL manager Mary WA3HUP MCs the operation. I have heard several reports that QSLs have not been forthcoming.

The recent operation by Bob and Gary from the VP2 call area has been completed with over 6,200 QSOs in the log. The QSL'ing is going to be difficult and they ask that the following arrangements be observed. VP2DAJ, VP2LY, VP2SN and 9Y4RK contacts go to VE3EWY, whilst those for VP2DAE, VP2LC/P, VP2SM and 9Y4VE go to VE3GCO, with a separate SAE and IRC for each contact.

A particular request for those sending out QSLs for Dick VQ9HJB. Send them to H. J. Best, Box 2850, Luanda, Angola, P.W.A., but please do not put any call sign on the envelope.

A few more words about recent and projected operation from Albania. Firstly, the OH2BH/ZA trip held recently has now been finalised, and the A.R.R.L. have okayed it. Over 800 contacts were made with 52 countries in the 8½-hour operation, and special cards have been printed. Yours should go to OH2BH. There is a good chance that Martti will return there next June, meanwhile DL7FT and VY hold reciprocal licences. OE1ZLC and ZLA, and were trying to make arrangements to operate from Albania Sept. 22 to 25. ZA1C who was heard on July 10 was allegedly a pirate.

Once again, there are more new prefixes about than one could shake the proverbial stick at, a glance through the Geoff Watts DX News-sheet reveals the following. 4N2KP was Kolocep Is. 4N2LO was Lopud Is. QSL to YU2NEG. UA4LM recently used the call U4L for some obscure reason. IL and IP have been previously mentioned on this page, as was FM0. 1T1SEZ/IU was from Ustica, and is valid as PX only. F2UM/A was on from Belle Ile, wherever that may be. F8BC/CN counts as CN0 for prefix hunters. HG100UA/E, the Lenin Centenary Exhibition Station operating portable from regions indicated by the suffix, QSL to HA bureau. KF0NEB is the Nebraska State Fair, QSL to W0YOY. The 5J and 5K stations were HKs under a contest prefix. Still they come, PA8 and PA9 were QRV mid July from Den Helder Naval Base, special QSL via the buro, whilst PA9TK goes to DJ6TK.

Still on prefixes, OI8SUF from Aug 5-8 was from a Scout camp in Lapland, QSL to either the OH buro or OH2BHU, Bob Ahinas, Perna, Finland. The final one is CB, several of these were used by OA stations to commemorate Peru's 149th anniversary of Independence. Maybe there is still another, yes, 4M0A from Los Monges, where that one is I don't know, other than that it is in South America.

Prior to the recent DX-peditions, 144 of the world's top DX men submitted lists of their most wanted countries. Since the lists were forwarded, there has been activity from Albania which is 3rd on the most wanted list, Palmyra 36th, Voltiac Rep. 36th, Geyser Bank 39th, Serrana Bk. 41st, Kure Is. 43rd, Blenheim Reef 51st. The most wanted ten were in order of need, Clipperton, Laccadive, ZA Bouvet, Maria Theresa, XU, 8th. Sandwich, BY, Spratley Is., YI, AC4 and 3Z5.

Finally, I have a few notes here for the S.w.l's. Firstly, Jock White has mailed me over three awards for the S.w.l. section of the last VK-ZL Contest. They are for the VK2/4/ and 5 winners, Steve Ruediger and myself collected the VK2 and VK5 section respectively, but the VK4 winner was B. C. Clark, L4144, and if that good fellow would forward me his address I will mail his certificate on to him.

Another item of very definite interest, but mainly to S.w.l's, is an item in Monitor re the handling of S.w.l. QSLs for certain DX stations. Rainer Kramer, DL7LV, is the QSL manager for S.w.l's only for the following stations. Please send IRCs with your cards to Rainer Kramer, 1 Berlin 46, Alt-Lichtenrade 53, West Germany. DL0TE, DL0TEA, DL7FT, DL7LV, DL7LVA, DL7NB, EA8AR, EA8AS, EA8BG, EA8BH, EA8BJ, F9UC/FC, HB0LL, HE1CB, HS3RB, KH6GQW, KL7EBK, KR6JT, KZ5EK, M1FT, OE7ZUI, OY7A, TA3AE, TF3ST, TF9TP, TU2AY, TU2AZ, TU2BB, W4UAF KH6, XE2YP, XW8BP, XW8CN, JA0CU, 3A2CN, 3A2CU, 3A2EE, 3V8BZ and 4A2YP.

Other QSL information will again have to be held over until next month. However before I close this page, there is one small point which I came across this week when looking around the bands this week. It concerns anyone who may own a Trio 9R59DE receiver. This is a general coverage rx, with bandspread on the Amateur bands. The 20 metre band is located on range C, and the bandspread dial is calibrated to match this range. However, 20 also appears on band D, which is the range covering 15 and 10, 20 however is not intended to be used on this range and has no corresponding bandspread. Try setting your bandspread on zero, your selector on range D, and you will find 20 metres at about 14250 on the main dial. You will then be able to use your bandspread by turning it clockwise, and get a far greater spread than on the normal position, as well as getting a far better performance from the receiver. In a check a few minutes ago, I started to move the bandspread from zero at the start of the c.w. segment, and by the time I reached the end of the bandspread, I had not reached the American phone band. Over double the bandspread, plus a vastly improved performance.

That's all for this month, thanks to Don AX3AKN, George ZM2AFZ, Geoff Watts DX News Sheet, Long Is. DX Assn. Monitor plus the I.S.W.L. news staff, and Mac Hilliard 73, and good DX from Don L2823.

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

"SOMETHING TO CONTRIBUTE"

Editor "A.R.," Dear Sir,

I note with interest the concern being shown by various sections of the Amateur fraternity, at the possibility of us losing some more of "our" frequencies.

Can we honestly justify the holding of four megahertz in the two metre band or thirty megahertz in the 70 cm band, or even for that matter two megahertz in the six metre band.

If we use modern narrow band techniques, all the activity in any v.h.f. band could be accommodated in 500 kilohertz and the two metre f.m. activity could be restricted to spot frequencies. The remainder of the two metre band could then be allocated for commercial mobile users who have a much better claim to the space. The same comments can be made about six metres.

The 70 cm. band needs to be able to accommodate a couple of t.v. channels for those who wish to use this mode and at present there may not be so much demand for this portion of the spectrum by other users.

As for the h.f. bands, the less said the better. If I may quote from the International Radio Regulations, etc., as found in the handbook, paragraph 55 —

"The licensee of an Amateur Station shall use his licensed equipment without pecuniary gain and solely for the purpose of investigation or research into, or instruction in, wireless telegraphy."

Assuming that the term "wireless telegraphy" can be interpreted in a somewhat broader sense, I would defy 90 per cent. of the operators on any band at the present time, to justify their existence at all. From this point of view, 40 metres is getting just about what it deserves and it is a pity that commercials haven't been strong enough at the conference table to do the same thing to twenty metres.

It isn't good enough any longer, just to get on the air for the sake of enjoying oneself. As Amateurs we ought to be doing a lot more to demonstrate to the world at large that we do indeed have something worthwhile to contribute—sometimes I doubt it.

—David D. Tanner, VK5AU.

BETTER USE OF MOBILE SERVICE SPECTRUM

[redacted] "A.R.," Dear Sir,

I would like to dissent with a line of urging in the editorials of "Amateur Radio" and many, if not all, publications in the field. These follow the common theme that there is high pressure on spectrum space, particularly v.h.f., and if we don't use it we shall lose the space we have. This is exactly the theme I would plant into these publications if I was a public relations man trying to manoeuvre my interests in acquiring this space for another purpose.

You seem to follow the tradition of use or lose and some alternative arguments must be presented for your consideration. We are in the situation of a person with property in the path of development and wish to retain that property. Wish alone will not be enough.

Conservation—a political watchword for the coming decades—is one plea that he can put which will carry weight in political circles.

Historic value—a brother of conservation, and again rising in strength as an argument in these days of asking, "Is the development worth the price?"

Surely the conservation parallel is evident by comparison with land use. The freeways of mobile radio and the drive-in theatres of the television channels are obvious parallels. The conservation of the countryside is the provision of that area for its enjoyment as itself, conservation of the spectrum can be the provision of space for its enjoyment as itself, the Amateur bands being a National Park of the spectrum.

The historic value angle has been pursued in the past and is still as valid as ever, although probably less powerful politically.

Another argument the "obstructor of 'progress'" can use is that his all is only a small fraction of big brother's total; how about big brother improving his modus operandi to not need the extra space. This argument needs to be put very subtly, preferably by insiders in big brothers camp. Let us look at what we have and who wants it. There could not be an extra t.v. channel gained if we lost all the 50 and 144 MHz. bands, aeronautical services have their area, and only one strong pressure remains—the mobile radio users. Mobile radio is run in a fashion which is inherently wasteful of space, by a system comparable with party lines for telephone working.

Here we are looking at big brother's space requirements and, noting that the pressure on mobile radio services is such that if our v.h.f. bands were fed to the mobile radio users they would only last a few years before their pressures were back to the earlier level.

The answer would seem to be—find a method of solving the mobile services dilemma, and make it one that pleases the three principal parties, and the pressure can be relieved from the v.h.f. bands.

The effective channel occupancy of mobile radio services is generally low, the inflexibility of one channel per service is the crux of the problem. Either time or frequency division multiplex of users under continuous control is the answer. The mobile radio spectrum could be cut into, say, 50 channel slabs with each user, mobile to base or base to mobile, capturing a transmitter frequency slot or time slot for each contact.

The mobile unit would require that its receiver listen to a control channel and on call be tuned to the allotted traffic slot automatically.

Back to the interested parties. Users would have less trouble with nuisance from other users. They would have to buy a new set, but with ICs the costs would not be excessive, and replacement at the end of a system's useful life could be arranged.

Equipment manufacturers would welcome the extra market the scheme would bring—lots more extra users than if Amateur bands were usurped. There would be fewer crystal problems since the synthisers would be similar for any of the users in any block of spectrum. Whilst questioning this scheme, it is as well to note that a synthizer using only two integrated circuits has been built.

The P.M.G. Department is a very important power in this proposition. I do not know their wishes, but they would have a powerful and long lasting series of decisions to make. Frequency or time multiplexing? Co-operative of users, private ownership, or P.M.G. ownership of master stations? One format or many? These problems could be solved if the will was there, and Amateurs (possibly in their professions) should be sowing the seeds now.

Summing up, more cogent arguments, better use of the mobile service spectrum and, still very important, get on those v.h.f. bands—all of them, not just one channel.

—Tom Berg, VK6ZAF.

Reference.—Editorial, "Wasteland Revisited," Electronic Design, Vol. 14, No. 23, November 8, 1966, p. 31. Discussing television and CATV, it takes a reference to television spectrum use as "a vast wasteland" and a television executive's assessment of that statement as a "conservative estimate". Later it describes (American, but isn't ours largely American?) television signals as "ambient, electronic air polution".

CAN WE AFFORD NOT TO HAVE AN INSTITUTE

Editor "A.R.," Dear Sir,

Your editorial last month is commendable, and although my experience of Federal affairs has been limited in recent years, I have been, as an "ex officio officer," in a position to see what was, even then, an intolerable situation.

I have no wish to amplify your remarks except to add that you sir, with due modesty, refrained from mentioning the EXTENT of the time that you and others expend in these honorary labours. However, I do wish to express concern at the fact that Federal Councillors appear to be grossly conservative, or alternatively, unwilling to put the issues strongly to their respective Councils and members. Council's apparent reluctance to face the situation and to sacrifice themselves a little appears at variance with the status achieved and the work done by Executive as described in the Presidential reports.

Amateur Radio in this country enjoys a status, a set of privileges, and operating conditions equal to or better than anything else in the world. They have been achieved in the face of increasing complexities in recent years, by a Federal Executive prepared to spend long hours at much personal sacrifice. What keeps them at it under such an unimaginative Council is beyond me, but it does seem that they show a certain spirit lacking elsewhere.

Of course the answer to the question you raise is money, and unpalatable as the thought is, it must be faced. The justification for extra money is based on two clearly defined truths.

1. The Institute has reached a stage of development where a lapse in the vigour of its activities cannot be tolerated. With commitments locally and internationally—Australia, I.T.U., I.A.R.U., and Region 3—a relaxing of its executive effort will put it in poor light with overseas societies, not to mention the Post Office.

2. With resignations, retirements or, what is worse, just a plain lack of interest, such a decline may occur. My observation of up and coming youth shows a reluctance to become involved in Institute administration. To do so anyway would be to perpetuate an anomaly within the context and conditions of this argument.

Sir, this is 1970; we must not wholly depend on the pioneering spirit of the nineteen twenties. We have a small population in a large country and whether we like it or not, our progress is such that we must keep up with modern techniques.

If this Federal Council is not prepared to ask for, and the members to give, an extra few dollars a year, then their salvation is not in Amateur Radio or the Institute.

Perhaps they might find it in a game of tennis.

—T. E. Straughair

PHOTOGRAPH IDENTIFIED

Editor "A.R.," Dear Sir,

It was my pleasure to receive copies of your August issue from two friends, both directing my attention to page 6. The page 6 picture was actually that of the Exhibition Committee of the (Radio) Wireless Exhibition organised under the auspices of the Wireless Institute, N.S.W. It was not the management committee of the Institute.

Those in the picture: No. 9 was Sid Colville and front row No. 2 was Mr Hungerford, of Western Electric (now S.T.C.).

I was Treasurer of the W.I.A. (N.S.W.) at the time and suggested the Exhibition, and undertook to organise the industry to support it, which was done with success and the W.I.A. finished up with over £800 net profit, pretty good for a first effort.

During the 60 years of W.I.A. activity it has proved its worth to the nation and to thousands as a pleasurable hobby.

With best wishes for every success to A.R.

—O. Mingay.

R.D. CONTEST

Editor "A.R.," Dear Sir,

Regarding the Remembrance Day Contest, I feel there should be more incentive for operators to use the c.w. mode, as compared to the phone mode of operation, in both the c.w. and open sections.

More time is required using c.w. to complete a contact. And due to the small percentage of c.w. operators active in the contest, more time is used in finding contacts.

At present an operator who wishes to contribute as high a score as possible for his Division, in the time he has available for the contest, has more opportunity by using the "Transmitting Phone Section," rather than the "Transmitting C.w. Section".

Considering the Open Section, an operator who uses the phone mode for the majority of the contest can gain more points than the operator who shares his time evenly with both modes.

Perhaps if a multiplier could be applied to scores obtained using the c.w. mode of operation, the percentage of A1 operators would not be so small.

I have included these comments with my log for the 1970 R.D. Contest, which has been returned to the Contest Manager, and thought that you may wish to publish them in "A.R."

—J. E. Loftus, VK3QK.

"PIN MONEY" FOR A SIDELINE

Editor "A.R.," Dear Sir,

On 6th August last on the 20 mx band a station in a common European country, but using an odd prefix (good for WPX only) was going through the dog-pile that was calling him as fast as possible.

In an hour he worked 40 or more stations and was still going. His QSO routine went like this: "RST QSL via buro with 3 IRCs, d t dit dit dah dit dah." Simple arithmetic will show that if all those he worked do as requested (and the majority will) he would gross close to 2½-3 dollars per hour (this allowing for the conversion loss of the IRC/dollar exchange.

If he sends his own cards direct postage, then the ethics of the operation are reasonably in order. Should he, however, simply send his QSLs via the buro, then it might be assumed that his pro rata nett profit would be in the vicinity of $2 per hour. This is not bad "pin money" for a sideline and for one that's not a real rarie. In fact, it is as good as many make in their regular employment.

In the case of this station there could well be some particular valid reason for this QSL request. This case is simply cited as an ex-

ample because the sad truth is that too many don't understand the ethics of QSLing in the Amateur Service—or do not want to—and are simply out to exploit their call and make a fast buck, i.e. petty shamateurism.

—Alan Shawcroft, VK4SS.

LECTURE ARTICLES

Editor "A.R.," Dear Sir,

As a reader of your publication "Amateur Radio," I feel that attention must be drawn to a series of articles designed to guide Amateurs in passing the P.M.G Radio Operator's Certificate, written by C. A. Cullinan, VK3AXU.

I refer firstly to Lecture No. 8 which appears in the now current August issue, for it was this article that compelled me to write. I feel I must voice my disapproval at the way Mr. Cullinan describes the action of power in an a.c. circuit.

On page 23 following "Comment: In a perfect a.c. generator . . ." Mr Cullinan says that the voltage and current are exactly in phase in the above described generator. Surely for any current to flow at all, whether it be in-phase or any other phase angle to the generator voltage, there by necessity has to be some sort of load connected to complete the circuit. For the described criterion of in-phase voltage and current to exist with the perfect generator, the load must be resistive, i.e. have unity power factor.

I believe that in the case of a perfect a.c. generator the phase angle of the current is wholly dependent on the power factor of the load. When any generator feeds any load, the resultant phase angle is a function of both the generator output impedance and the load impedance.

The situation can exist where the generator is inductive for example and the load an equivalent capacity in series with a resistor. At a particular frequency, namely the resonant frequency of the inductor and the capacitor, the two reactive terms can vectorially sum to zero and all the volt-amps. produced by the generator are dissipated in the load and hence unity power factor exists in the circuit. I consider Mr. Cullinan's statement "A good knowledge of the meaning of Phase is essential for an understanding of a.c. theory" to be undoubtedly true, but so inconsistent with his explanations.

Further on under the same heading "Comment", there is discussion of a watt-hour meter. Mr. Cullinan says that "the power taken by the load is measured by a watt-hour meter and is the power you pay for," and further on "But, if the load contains reactance, you do not get useful power from all you bought . . ."

These statements convey the impression to me that the watt-hour is not sensitive to power factor, and that it would show a reading if a load of zero power factor, i.e. a capacitor was to be connected to it.

It appears that Mr. Cullinan thinks a watt-hour meter measures, "apparent power". While this term is not necessarily misleading, the modern terminology of it is volt-amps. This is a figure calculated by multiplying the applied voltage by the current flowing. In fact a watt-hour meter does not necessarily measure volt-amps., but measures exactly what its name implies, the product of power (watts) and time (hours). Power is calculated by the product of applied voltage, current flowing and the power factor of the circuit. As a matter of interest, watt-hour meters are adjusted to give a zero reading within prescribed defined limits when a specified load of zero power factor is connected to it.

All this means in short is that a consumer may connect a load to his power outlet that consumes, say, 1,000 volt-amps., and if the supply voltage is 250 volts, a current of 4 amps. will flow. If the load is a perfect capacitor, the consumer will not get charged for this service since his watt-hour meter will not register.

Noted under the next "Comment" in the article is the fact that "194.2 watts of power (I think the writer means 1194.2 watts) are paid for but not used." I think my above discussion shows this not to be so. I stress again that the consumer does not get charged any extra for using equipment that has a power factor other than unity. However, since there is inherently more current flowing in the line supplying a load of low power factor, there will be more voltage dropped in the line. If the consumer loses at all it will be due to this fact, i.e. if the conductors from his power meter are not as low in resistance as they might be, he will suffer a loss of voltage arriving at the load, but in any case he will not be charged any more than the actual energy consumed in his circuit.

The next point in the article concerning the reduction in rates if a large consumer corrects his power factor, I feel is worth commenting on. I do not know this fact to be true but have no reason to disbelieve it because it is actually the power authorities who will lose by supplying power to a consumer who has a power factor that is not unity.

Since for a given amount of power consumed there must be a line current flowing which, for the same power, will be a minimum only when the load has unity power factor. As the power factor decreases, the line current increases, which will inherently cause larger voltage drops in the transmission lines between the power station and the load. This voltage drop constitutes power lost in transit since the line impedance is mainly resistive at power frequencies. Thus the power authorities have to generate more power than they can actually sell to the consumer to overcome the losses incurred in transit. It is obvious that these losses will depend upon the power factor of the load and they will be at a minimum only when the load has unity power factor. Thus it is not surprising that the power authorities will give some form of allowance to a consumer who corrects his power factor towards unity. This above explanation, I think, clarifies Mr. Cullinan's statement that "the closer the public demand is to unity power factor the less useless power has to be generated". The useless power being that which is dissipated in the power lines.

I notice Mr Cullinan's statement on top of page 23 concerning accuracy, "The student should calculate all the above to at least four decimal places" I think he really means four significant figures since the ridiculous condition could exist where an answer may take the form, e.g. 8,527.5704 watts, quite an unrealistic accuracy. A fundamental law says that the number of significant figures in an answer derived by the process of multiplication or division may never exceed the minimum number stated in the given data. A far more practical approach would be, e.g. 8,530 watts, i.e. three significant figures considering that the general maximum resolution of a slide rule is three significant figures and logarithms four significant figures.

Accuracies better than above would normally mean a long-hand calculation which can be a waste of good time which is, in my experience, never a good practice in any examination. The accuracy of the given data would have to be assumed to be at least four significant figures if the answer is to be stated to three significant figures, which is normal practice.

The above discussion is illustrated in the answer to part (c). Mr. Cullinan takes at least four steps of calculation to arrive at the answer which I will show is incorrect due to inaccuracies carried through the four steps.

My approach to this part of the question would be to determine the actual wattful power in the circuit. We know from a previous part of the question that the current flowing is 17.07 amps. (correct to 4 sig. figs.). The only element in the circuit which can dissipate power is the 25 ohm resistor which has the 17.07 amps. passing through it. Hence we can calculate the power in it as follows

Power equals current squared multiplied by resistance,
equals 17.07 squared multiplied by 25,
equals 7270 watts (4 sig. figs.).

We can see a discrepancy of about 60 watts from Mr. Cullinan's answer. This method required only one mathematical manipulation to arrive at the answer and thus no approximations are carried through. By finding the phase angle magnitude from tangent tables and then finding the cosine of the angle again from trig tables, an error was introduced as I will show.

Power factor equals real or wattful power divided by reactive power,
equals 7276 divided by 8530,
equals 0.8530 (3 sig. figs.)

We have a discrepancy of 0.007 in the cosine of the phase angle which is enough to give a different magnitude of angle.

The final result of Mr Cullinan's calculation in this section is that the error in power is approximately 0.83% high and the phase angle 1.5° low.

The errors accumulated early in the calculation when the phase angle was initially found from a tangent relationship. I agree with Mr Cullinan's figure of nett reactance of 15.39 (4 sig. figs.), but the value of tan phase angle equals 0.6116 (4 sig. figs.). From tangent tables phase angle equals 31.47 degrees (4 sig. figs.). Also from tables, cos 31.47 degrees equals 0.8519 (4 sig. figs.). Hence power equals 8530 x 0.8519, equals 7269 (3 sig. figs.)

In the above problem, all intermediate answers had to be kept accurate to at least 4 sig. figs. so that the final answer be accurate to 3 sig. figs. Keeping the accuracies of angles and trig. functions to 4 sig. figs. is quite a lot of bother but was quite necessary in this case to justifiably give the answer of 7280 watts.

Mr Cullinan's answer of 7335.8 watts appears to be found as a result of correcting an answer of tan phase angle to one significant figure, i.e. tan phase angle equals 0.6, yet the answer is expressed with 5 sig. figs. Note here also that Mr Cullinan's earlier requirement for 4 decimal places to be used in the impedance calculation were obviously considered not warranted in this subsequent part answer.

I feel that by publishing answers to problems of this nature to accuracies that are quite inconsistent with methods of computation available to the student, even when the answers happen to be arithmetically correct to perhaps 5 sigs. figs., is often misleading. A case like this is when a student may spend much wasted time striving to arrive at the published answer to verify his technique when, for some obscure reason, that particular method may only yield an answer correct to 3 sig. figs. with normal computation methods.

It is my opinion that the second half of lecture No. 8 is plagued with quite misleading basic ideas which places the potential Ham at a great disadvantage in that he has to pass an examination which will be assessed by a person in the P.M.G whose basic ideas are based on much firmer ground. Propagation of such fallacies at such a basic level to a student coming to grips with these principles for the first time will ultimately lead to failure. If per chance he scrapes through the exam., we have scored one more misguided Ham.

My sentiments concerning Lecture 8 prompted me to browse over Lecture 5. I wonder if Mr. Cullinan has heard the term "root-mean-square," abbreviated "r.m.s."? At the end of the article, Mr. Cullinan says that "When dealing with a.c. power systems, a.c. motors and the like, it should be remembered that voltages are quoted on an average figure. It may be of interest, Mr. Cullinan, to know that the average value of any symmetrical voltage or current waveform is strictly zero provided there is no d.c. off-set present. Its r.m.s. or effective value is, however, a factor of 0.7071 of its peak value. This r.m.s. value is the magnitude of equivalent a.c. that will produce the same heating effect as the same magnitude of d.c. when each in turn is passed through or placed across a resistor.

The term "average value" is reserved for another application where it is defined as being 0.636 of the a.c. peak value. This application refers to each half cycle in turn of a waveform and this average value is the magnitude of equivalent a.c. that will produce the same magnetic field as the same magnitude of d.c. when each in turn is passed through any suitable flux-producing coil, bearing in mind that the flux will change direction each half cycle.

This "average value" finds application particularly in rectifier type moving coil a.c. meter. The waveform in this case is usually a full wave rectified version of the input waveform. The meter reads as though d.c. were being measured, being related to the deflection by meter current (d.c. component equals 0.636 x a.c. peak current. However, the meter multipliers and shunts are adjusted so that the scale reads the actual r.m.s. value. For a pure sine wave the difference is about 11%, i.e. meter is corrected by 11%. It is important to note that a moving coil rectifier a.c. meter only reads the correct effective or r.m.s. value for the case of a pure sine wave. When measuring other types of waveforms, allowances must be made if the correct answer is to be found.

All waveforms have a figure which will indicate the type of correction required. It is called "form factor," and is the ratio of r.m.s. value to the average value. For a sine wave, the form factor is 1.11.

I hope that my comments may assist in assessing the problem that exists in the two most recent lectures of this series of articles and that whether they are used in full or in part for publication, may assist newcomers introducing themselves to the technical mysteries of electronics.

—G. N. Twining, VK5TE.

☆

1970 CATALOGUE OF BOOKS ISSUED BY TAB BOOKS

TAB Books, Blue Ridge Summit, Pa., 17214, U.S.A., publishers of the famed Gernsback library books, has just released its spring 1970 catalogue. Describing over 125 current and forthcoming books, the illustrated 16-page catalogue covers the following subject area: Schematic/servicing manuals, broadcasting, basic technology, CATV, electric motors, electronic engineering, reference, television, radio and electronics servicing, audio and hi-fi, hobby and experiment, test instruments and transistors.

Among the new and forthcoming titles featured are "How to Repair Home and Auto Air Conditioners," "Small Appliance Repair Guide," and "Magnavox Color T.V. Service Manual." The catalogue is available free upon request.

VHF

Sub-Editor ERIC JAMIESON VK5LP
Forreston, South Australia, 5233.

Closing date for copy 30th of month.
All Times in E.S.T.

AMATEUR BAND BEACONS

VK4	144.390	VK4VV, 107m. W. of Brisbane
	53.000	VK5VF Mount Lofty
	144.800	VK5VF Mount Lofty
VK5	52.006	VK5VF Tuart Hill.
	52.900	VK6TS Carnarvon
	144.500	VK6VE Mt Barker
	145.000	VK6VF, Tuart Hill.
	435.000	VK6VF on by arrangement)
VK7	144.900	VK7VF, Devonport.
ZL3	145.000	ZL3VHF, Christchurch.
JA	51.885	JA1IGY, Japan
W	50.091	WB6KAP U.S.A.

A letter has been received from B. Cabena, VK3BEC, of Kew, Vic., advising he is at present constructing a transmitter for use as a beacon on 580 MHz. Experiments are to be carried out with an omni-directional antenna, and he is interested in ascertaining the maximum distance of reliable reception. The beacon will use f.m. and VK3BEC would be interested to hear from others in VK3 who would be prepared to assist with experiments. So now over to VK3s.

While on the subject of beacons, one correspondent has mentioned that work is proceeding on the proposed VK3 beacon, those in the surrounding States are hoping it may be operational for the current DX season. Also note that the VK6 2 metre beacon at Mt. Barker was heard at S3 in Geelong on 7th August between 1735 and 1745. It seems only a matter of time before the beacon is heard in VK7, particularly around Burnie. I wonder how many around there and nearby Devonport monitor the frequency of the VK6 beacon during periods when in the shack doing other things besides in QSO?

While we are talking about VK7, a letter has arrived from Winston VK7ZM/T indicating he is now operational with Amateur Television transmissions on 426.000 MHz d.s.b. with f.m. sound 5.5 MHz. above (and below) vision carrier. Normal standards are used for line and field frequencies and modulation polarity, but received picture will not have interlacing. The tx runs 30w input to a QQE03/20, series modulated with a 6CM5, vidicon camera and elementary sync. pulse generator. Winston would welcome reports from VK3 and VK3, and would be interested to hear from anyone equipped to receive such transmissions with a view to arranging 2 metre a.m. skeds for use during band openings.

Those of you rushing in and purchasing crystals for Channel A f.m. units might take heed from a comment in the latest issue of the Newsletter from the Geelong Amateur Radio and T.V. Club, and I quote: "A Step Forward. In keeping with standard practice, all VK7 stations operating 2 metre f.m. are now using Channel B (146 MHz.) as their primary simplex frequency, and the now obsolete Ch. A is used as their experimental frequency. This leaves only isolated operation on Ch. A in small areas, mainly Victoria. It is hoped these areas will shortly fall into line with what is now world-wide practice." Unquote. Good! It will save me some expense, thought I would have to include Ch. A in my unit one day in order to conform!

VHF CONVENTION

The VK3s have gone to a lot of trouble to make their 7th Annual Convention a success on 10th and 11th October. Briefly, it is being held in the Community Hall, Jukes Rd. Fawkner, on the road to Sydney. Excellent trophies are being offered. The Convention starts at 1200 on 10th and you can be talked in on 53.032 MHz. and 144.5 MHz. on a.m. or 146 MHz. f.m. The address at 1400 hours by Les Jenkins, VK3ZBJ on "System Requirements for Operation through AMSAT-OSCAR 6" should be something worth hearing. There are fox hunts, auction scrambles, 432 MHz. antenna gain competition, special dinner, etc., etc. Amongst other things you are asked to bring your best piece of home constructed gear, which must be in working order. This particular section I favour very much in these days of so much commercial gear being used, and it is pleasing to see such an item being included in most Amateur gatherings.

VK3 is certainly going all out at present to enthuse as many operators as possible towards Field Day operation. Following is a list of current dates, each being a Sunday, and operating times are between 1100 and 1600 hours. 1st November, 6th December, 3rd January, 14th February (co-inciding with N.F.D.), 7th March and 11th April. So there you have a wide choice. And if this sort of operation does not satisfy you, there is another choice in 2 metre scrambles being held in VK3 each second Sunday of the month between 2145 and 2115, and a special invitation is extended to more country stations to participate.

ANTARCTIC OPERATION

Following my paragraph last month about Keith VK5ZKG going away down into the cold country, a letter has arrived from Keith with details which should be of interest to many. He will be leaving in December for a 15 months' stay at Mawson Base and will be taking 6 metre gear with him, which includes a 4 element Yagi, his mobile rig and parts for a linear using a 4/250A. Keith is currently studying c.w. and hopes to pass before going down there. This will enable him to have a 20 metre link! Although he expresses doubt about working back to Australia from so far away, nevertheless, it's worth trying, and the 15 months stay will give him two DX seasons in which to make the efforts. One problem of course will be that if the bands really open up at any time, the stronger stations from mainland Australia will probably make him difficult to find. The beacons in VK3 and VK7 should be of some assistance for either 6 or 2 metre operation. Keith will be working with the Ionospheric Prediction Service, and helping in a small way (his words) to produce the Prediction Charts which appear regularly each month in "Amateur Radio". He will be installing a new Ionosonde built by the I.P.S. in Sydney, and this is the equipment which plots the reflecting layers in the ionosphere and producing a record on 35 mm. film. Amateurs in New Zealand could well note that Keith will be attempting to work long distances on 6 metres. Good luck to him!

David VK8AU at Tennant Creek reports the JAs are making their appearances again on 6 metres and were available on no less than nine occasions during the first three weeks of August, most signals being F2 and between 1730 and 1930 hours. September and October will be good months to watch the band. Doug VK8KK predicts 1971 should be a bumper year for trans-equatorial communication and every possibility several new call areas to the north may be on 6 metres before long.

METEOR SCATTER OPERATIONS

Last February it was 2 metres which stole the prizes for the big opening right across southern Australia from West to East. Now, 6 months later, 6 metres has come into its own with a sudden startling increase in interest in contacts using the medium of meteor scatter. Monday, 10th August, will be a date to remember, for then David VK8AU at Tennant Creek worked VK8KK in Darwin, VK5ZWW/8 located at Andamooka Opal Fields in central South Australia, and VK5ZDX in Adelaide. As these operations open up a field scarcely touched by most, I propose going into the operations in more detail than generally would be the case, particularly as information on other matters still remains scarce.

Credit for the initiation of these operations must go to Wally VK5ZWW, and the following has been prepared by him for "A.R." "The purpose of the visit to Andamooka Opal Fields during August 1970 was surveying, noodling and Ham Radio. 6 metre gear was taken in case there were early TE openings to JA and the possibility of extended ground wave to Adelaide (300 miles) through the high pressure systems which pass through the middle of the Continent this time of the year. Skeds were arranged with Adelaide each night on 53.010 MHz. at 2200 hours from 4th August. I was to call south for five minutes and then listen for five minutes, up to 2230. Abridged results are as follows:

4/8—Several bursts s.s.b. after 2200.

5/8—S.s.b. and c.w. on 52100 2023-2032 (was VK8AU), s.s.b. and carrier after 2200.

6/8—C.w. on 52100 2030 to 2042. Carrier and s.s.b. after 2200 ident. VK5ZDY and my call several times.

7/8—Equipment failure (unexplained).

8/8—Copied VK5ZDX-VK5ZWW and VK5-ZDY VK5ZWW several times. Sent 3/3 to VK5ZDY as he was best. No report back.

9/8—Almost completed contact with VK8AU 2150-2158. Nothing from Adelaide. Between 2223 and 2247 I sent VK8AU 3/3 and received 4 4 and then both confirmed these reports via meteor scatter, both stations on s.s.b. and 52010 KHz. (It has since been reported one burst of VK5ZWW was heard by VK8KK in Darwin.)

10/11/12/8—Received reports 3/4, 2/2 and 3/3 from VK8AU and sent 3/4, 3/3 and 3/3. Also identified VK5ZDX, VK5ZDY and VK5QZ from Adelaide, sent reports to each but no replies.

"Since being back in Adelaide VK8AU has been regularly copied via random meteor scatter. From what I can gather the contact with David VK8AU on 9th is the first two-way s.s.b. contact properly confirmed on the air via MS in Australia. It may also be the first two-way of any kind. There have been many cross-band contacts on forward scatter and MS reported, but I have not heard of a two-way before. We were fortunate that the Perseids Shower was current during the tests.

"Techniques used were to identify 'This is VK5ZWW' over and over for five minutes. Do not use phonetics or CQ, they are a waste of time.) Then listen for five minutes, and if a station is identified then repeat 'VK—— VK-5ZWW you are -/- (suitable report) for five minutes. Listen again for five minutes for a report and confirmation, then confirm the report received for five minutes 'VK—— VK-5ZWW roger 4/4'. It may be necessary to send your report for more than one five-minute period. It is important that transmitting and listening periods are accurate to within a couple of seconds and the frequency be within 300 cycles.

"I am particularly interested in keeping this going and would like to see it supported on a nation-wide basis. Anyone interested in skeds should get in touch with me direct and I will pass on current information. S.w.l. reports would be helpful. The next shower that looks useful could be the Giacobinids around 9th October. Gear used at Andamooka Basic unit, FT-DX-100 at 28 MHz. into home-brew transverter running 120w p.e.p. into QQE06/40 and using a VK3 FET converter. 4 el. Yagi 15 ft. high. 240 volts a.c. from Honda E IV 300. Also many TU's were used during listening periods." —VK5ZWW ex-ZL2TCW.

As the report of the above activity may stir the thoughts of others to give it a try, some further information which may be helpful is here noted. David VK8AU states: "Contrary to normal Es propagation where the best distance is about 1,000 miles, meteor scatter from here (Tennant Creek, N.T.) seems best in the 500 to 700 mile range, at 1100 is getting down a bit and at 1300 miles quite poor. Apparently the most useful meteors are comparatively low in the E layer. The next useful shower is due on 9th October, then followed by the Orionids 20th to 23rd October. The biggest one is the Geminids on 13th and 14th December. Signals can usually be heard during non-shower periods but the equipment requirements become more stringent, 100 watts at least, preferably c.w. or s.s.b., and at least a 5 element Yagi are required to make much impression. The rig here is almost 400 watts p.e.p. on s.s.b. and a Swan type Yagi with 9 elements on a 37 ft. boom.

"If anyone wants to make skeds, please write direct or contact me on 3655 at 2200. I am at present designing an automatic keyer using digital techniques to enable me to send some good 30 w.p.m. c.w. This seems to be the most effective speed as the longer bursts are generally less than three seconds.

"Regular skeds are running with VK5ZWW and VK5ZDX from 2130 to 2230 most nights with other irregular skeds with VK8KK. We usually get enough signal to positively identify each other, but not sufficient for a two-way QSO. Others are most welcome to listen, but please call ONLY in the 5 to 10 minute and 15 to 20 minutes, etc., i.e. the alternative 5 minute segments. We use 53.010 MHz."—VK8AU.

Doug VK8KK has a small say on the matter and says it is good to at last see some of the boys in the South taking an interest in MS. It should lead to better equipment and more s.s.b.! He is currently looking for some more antenna gain over and above his 9 element beam so the 540 miles path to VK8AU can be established on a regular basis. He says they are almost there and can "feel" signals all the time but can't read it! So he might try a couple of Swan 9 element Yagis.

Bob VK5ZDX is another to feature in these operations and has sent me many pages of information, photocopies of letters and telegrams passed between the northern boys and Adelaide, etc. Too much for inclusion here, but as I am now attempting to promote interest in meteor scatter operation, some points from Bob may be of interest. On Sunday, 9th August, Bob received more than 14 bursts in the first five min. period, some lasting for two seconds, and included portions of call signs, and mixture of c.w. and s.s.b. The second five-minute listening period finally resulted in complete ident "VK8AU this is VK8AU", thereby indicating who the c.w. station had been. Bob was able to simultaneously hear both Wally VK5ZWW 300 miles away and David VK8AU 1190 miles distant, with David mostly the stronger of the two.

Conditions on the next evening were better and whole words and call signs were received over and over again, culminating in two-way

(continued on page 25

SILENT KEYS

It is with deep regret that we record the passing of—

VK2JZ—Alec Mather.
VK2LS—Lionel Todd.
VK6CP—Clarrie Cooke.
VK6LU—Lou Stagg.

VHF NOTES

(continued from page 24)

reports being exchanged 5 x 4 for the 1100 miles. These have been confirmed by QSLs. Congratulations Bob and David for a fine effort. Bob is now in the course of constructing a high power linear for his s.s.b. exciter and together with thoughts of a 9 element beam on the north looks like really getting into the fray: around the end of the year will be looking for stations 500 to 1200 miles distant to the north and west. To the east the Mt. Lofty Ranges present an obstacle, but may be worth considering anyway.

So there you are chaps. Main requirements for worthwhile participation seem to be at least 100 watts of a.m., preferably s.s.b. to the legal limit, a 6 element or more antenna, ability to read out your frequency to 200-300 cycles and stay there, low noise converter with stable tunable i.f., someone at the other end to keep skeds with you, plenty of patience and your just rewards may be quite surprising. If you can run to high power c.w. you may even do better. Good luck.

Doug is operational on 52 and 144 MHz., and 432 MHz. receive only. On 52 MHz. he uses both s.s.b. and c.w., running 200 watts p.e.p. to a pair 6146Bs with a 9 element wide spaced (35 ft. boom) Yagi up 55 feet. The converter uses an FET front end and 28 MHz. tunable i.f. On 144 MHz. he again uses s.s.b. and c.w. but his work is severely limited by location. Antenna is a 12-turn helix to 6CW4 converter. A similar converter is used on 432 MHz. He also operates on the 146 MHz. f.m. net.

The areas worked on 52 MHz. read almost like the pages of a call book, being VK1, VK2, VK3, VK4, VK5, VK6, VK7, VK8, VK9 Papua, VK9 New Guinea (counting as two countries), ZL1, ZL2, ZL3, ZL4, W6, VS6, HL9, 9M2, KW6, KG6, DU1, KJ6, KR6, KM6 and all JA districts! Total of 14 countries and on my calculations 34 call areas at least! A very outstanding effort Doug. Fitted in with all this of course is some h.f. operating, with such things as FT-DX-400, and KWM-1, etc., on 80 to 10 metres. Looking to the future, Doug wants to continue looking for more countries on 52 MHz., and further scatter experiments.

Looks like I shall have to conclude these notes at this point. I hope as many of you as possible will write to me about doings of general interest in your areas, this is the only way the page can be kept going satisfactorily, and with the coming DX season hope to hear from many correspondents.

Thought for the month, "The easiest way to teach children the value of money is to borrow it from them!" 73, Eric VK5LP, the Voice in the Hills.

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FOR SALE: From the estate of Alex Mather VK2JZ, one of Australia's leading DX men. 1 Heathkit SB100 Transceiver with external VFO, power supply and handbook, $400. 1 professionally built copy of Heathkit SB200 Linear, pair 572Bs in final, fully metered, fan cooled, with in-built power supply, $300. 1 professionally built copy of the Swan 240 Transceiver with speaker and power supply $200. 1 Drake 2B Communications Receiver, $225. 1 all-band SSB Phasing Rig with VOX, ALC and power supply, $150. 1 all-band SSB Phasing Rig with Linear (parallel 813s) and power supply, rack mounted and fan cooled, $300. 1 40 ft. Antenna Tower, prop. pitch motor rotator, 20 metre quad direction indicator, power supply, antenna tuning unit, 5 position co-axial antenna switch, low pass filter and SWR meter with all cables and co-ax., dismantle and remove at own expense, $125 o.n.o. 1 30 ft. crank-up Tower with 10 and 15 metre quads with all cables, co-ax. and antiference rotator and indicator, dismantle and remove at own expense, $100. 1 SSB Modulation Monitor with external 5BP1 CRO tube and screen, $20. 1 portable SSB Modulation Monitor with 1 inch CRO tube $15. 1 50 ohm 50 watt Dummy Load with thermocouple ammeter $15. 1 RF Indicator fitted with Palec 50 uA meter, $5. 1 Capacitor Checker, $10. 1 5 MHz. 2AVA Crystal Filter complete with matching USB/LSB carrier crystals, $8. Complete sets "A.R.", "CQ" and "QST" What offers? 1 Smiths Electric Clock, $10. 1 pair of Akai Headphones, $5. 1 Yaesu Musen Vernier Dial, $8. P.A. Equipment: 2 20 watt Sound Columns, 600 ohm line, $20 each. 1 A.W.A. 60 watt Amplifier multiple tappings on output $50. 1 10 watt Amplifier, $10. 1 A.W.A. 15 watt Amplifier, $20. 1 A.W.A. AC/DC Amplifier, 5 watts, $15. 1 A.W.A. AC/DC Amplifier 10 watts, $12. 2 15 watt 16 ohm Driver Units, $30 each. 5 Reslosound Driver Units, 10 watts, including 600 ohm line to VC transformer $30 each. 1 Carbon Microphone Loud Hailer, $10. 5 6-ft. Horns, $15 each. 3 2-ft. Reflex Horns, $10 each. 1 15-inch Reflex Horn, $8. Sundry Microphones, Extension Cables, etc. Firm written offers only to Mrs. G. Mather, 14 William St., Singleton, N.S.W.

FOR SALE: HRO Receiver with pwr. sup. but no speaker, $80 or offer. Bendix Frequency Meter LM 10 CRR74028 with modulate facility, calibration book and pwr. sup. $30 or offer. Write VK3AXO J. Dunne, P.O. Box 165, Tatura, Vic. 3616.

FOR SALE: Hy-Gain 4 element 6 meter Beam $30; Dow-Key Co-ax. Relay, 12v., $10. Range of Eddy-current Condensers, 4CX250B and air socket $20. A & R H.-Voltage Power Transformers and Chokes, all above new in boxes. Pye T.V. Camera with 2.8 lens, ass. vidicon $45. Send for complete list of parts. S. Day, 35 Mount St. Glen Waverley, Vic. Phone 560-9438 after 5.30 p.m.

FOR SALE: W.F.S. 500 12v. Transistor Power Supply for Swan 350 or 500 Transceivers for operation of Swan or similar unit at full power input ready to plug into any Swan unit. $55. A.W.A. MR10 F.M. Carphone for use as a base converted with xtals for Channel 8 but less power supply, write for full details. $18. Ian McCosker, P.O. Box 299, Morse N.S.W. 2400. Phone 52-2060.

FOR SALE: 60 ft. crank-up tilt over Tower. Guyed top section, self supporting. If only used to 40 ft. Four years old. $150. J. A. Ferguson, 594 Plenty Rd., East Preston, Vic., 3072. Phone 478-3575.

KW2000 90w. p.e.p. Top to Ten Transceiver. Offers to VK3BAE, F4/10 Daley St. Elwood, Vic.

SELL 12-15v. 300w. Petrol Electric Generating Set, $42; Transformers 630v. 750 mA. (2) $6.50 ea., 2,000v. 500 mA., $10.50, 450v. 250 mA. 6.3v. 3a. 6.3v. 1a. 5v. 3a. $4. 600v. 250 mA. $4.50. V.H.F. Equipment, Vinten Base Station (6/40 final) unconverted. $32; Pye Base Station converted 53.1 (less tx transport), $30; Pye Reporter Mk. II A., converted 53.1 $12 (less crystals). Geloso 4/104 V.F.O. Tuning Condenser and Trimmers, $2.50. C. James VK5KA, 10 Broadway, Glenelg S.A. 5045. Phone 95-2589.

WANTED: Collins 32S-3 Transmitter. Details and price to VK3ZGC, 2 Kalmia Ave., Mt. Waverley, Vic. 3149. Telephone 277-4798 (Melb.).

WANTED: In good condition, 3 or 5-band commercial S.S.B. Transceiver, trap vertical antenna 14AVQ or similar and semi-automatic key. Inspection in southern States early October. Prices and particulars to D. Macauley, 25 Parkmore St. Boondall, Qld., 4034.

WANTED TO BUY: AR7 Receiver in original condition, can be less coils and power supply. "Amateur Radio" back issues May to December 1957, August 1963. Colin Gracie, Cavendish Post Office, Vic. 3408.

WANTED TO BUY: Star ST-700 Transmitter in any condition. Must have handbook. All replies answered. S. King, VK3YDK, 1 Kalma Ave., Mt. Waverley, Vic., 3149. Phone 569-2521 (b.h.) 277-4748 (a.h.).

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EIMAC TYPE	CLASS OF OPERATION / SERVICE	TYPICAL OPERATION — SINGLE TUBE								
		D.C. PLATE VOLTAGE	D.C. PLATE CURRENT (AMPERES)	D.C. SCREEN VOLTAGE	D.C. GRID VOLTAGE	APPROX. MAX. DRIVE POWER (WATTS)	APPROX. D.C. SCREEN CURRENT (AMPERES)	APPROX. D.C. GRID CURRENT (AMPERES)	APPROX. MAX. POWER OUTPUT (WATTS)	FILAMENT VOLTS / AMPERES
3-400Z	B / SSB	3000	.100 / .333[2][3]	—	0	32	—	.12	655	5.0 / 14.5
3-1000Z	B / SSB	3000	.240 / .670[2][3]	—	0	66	—	.30	1360	7.5 / 21.3
4CX250B[1]	AB1/SSB	2000	.1/.25[2][3]	350	−55[4]	0	0/.005[4]	0	300	6.0 / 2.5
	C/CW	2000	.25	250	−90	2.9	.019	.026	390	
	C/AM	1500	.20	250	−100	1.7	.02	.014	235	
4CX300A	AB1/SSB	2500[2]	.1/.25[2][3]	350	−55[4]	0	0/.004	0	400	6.0 / 2.5
	C/CW	2500[2]	.25	250	−90	2.8	.016	.025	500	
	C/AM	1500	.20	250	−100	1.7	.02	.014	235	
4CX1000A	AB1/SSB	3000	.25/.90[2][3]	325	−60[4]	0	−.002/.035	0	1680	6.0 / 10.5
4-65A	AB1/SSB	3000	.015/.065[2][3]	350	−85[4]	0	0/.006	0	130	6.0 / 3.5
	C/CW	3000	.112	250	−105	1.6	.022	.009	270	
	C/AM	2500	.102	250	−150	3.1	.026	.013	210	
4-125A	AB1/SSB	3000	.03/.105[2][3]	510	−95[4]	0	0/.008	0	200	5.0 / 6.5
	B/SSB[2][5]	3000	.02/.115[2][3]	0	0	16	0/.03	0/.055	240	
	C/CW	3000	.167	350	−150	2.5	.03	.009	375	
	C/AM	2500	.152	350	−210	3.3	.03	.009	300	
4-250A	AB1/SSB	3000	.055/.21	600	−110[4]	0	0/.012	0	400	5.0 / 14.5
	C/CW	3000	.345	500	−180	2.8	.06	.01	800	
	C/AM	3000	.225	400	−310	3.2	.03	.009	510	
4-400A	AB1/SSB	3000	.09/.30[2][3]	810	−140[4]	0	0/.018	0	500	5.0 / 14.5
	B/SSB[2][3][5]	3000	.07/.30[2][3]	0	0	40	0/.055	0/.10	520	
	C/CW	3000	.35	500	−220	6.1	.046	.019	800	
	C/AM	3000	.275	500	−220	3.5	.026	.012	630	
4-1000A	AB1/SSB	4000	.17/.48[2][3]	1000	−130[4]	0	0/.04	0	1130	7.5 / 21.0
	B/SSB[5]	4000	.12/.67[2][3]	0	0	105	0/.08	0/.15	1670	
	C/CW	4000	.70	500	−150	12	.137	.039	2100	
	C/AM	4000	.50	500	−200	11	.132	.033	1910	
3CX100A5 / 2C39A	C/CW[7] / C/AM[7]	800	.08	—	−20	6	—	.03	27	6.3 / 1.0
		800	.065	—	−16	5	—	.035	18	

[1] Ratings also apply to 4X250B.
[2] Ratings apply to 4-250A within plate dissipation limitation.
[3] Zero signal and maximum signal dc current.
[4] Grid and screen grounded, cathode driven.
[5] Adjust to give stated zero-signal plate current.
[6] For operation below 250 Mc only.
[7] At 500 Mc.

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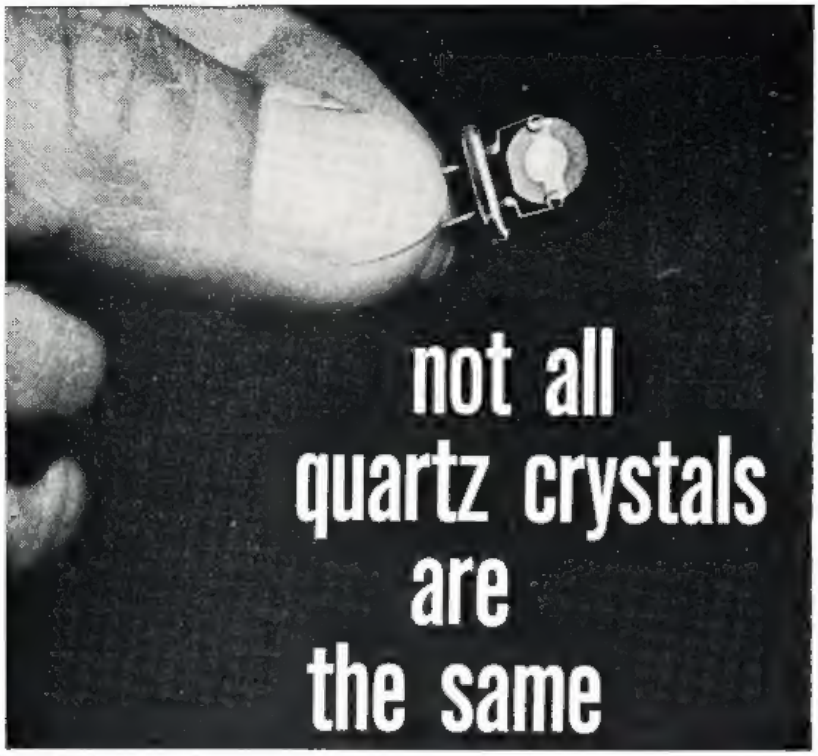
ETG 1169



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NT: Combined Electronics Pty. Ltd., Darwin. Phone: 6881.
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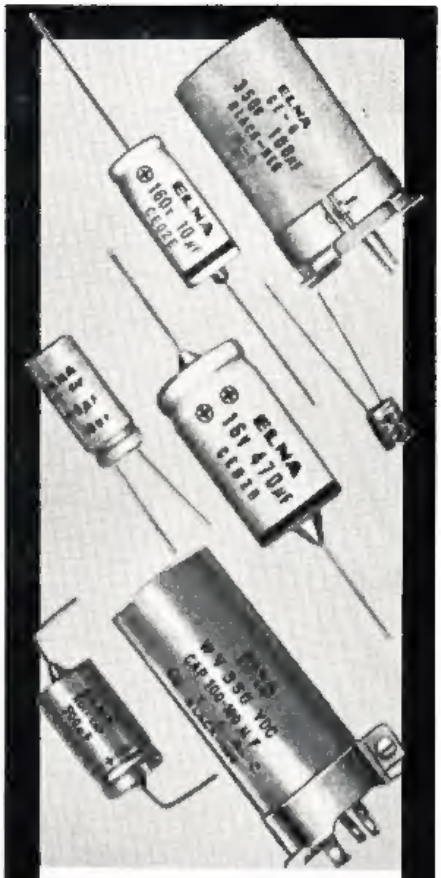
HQ01



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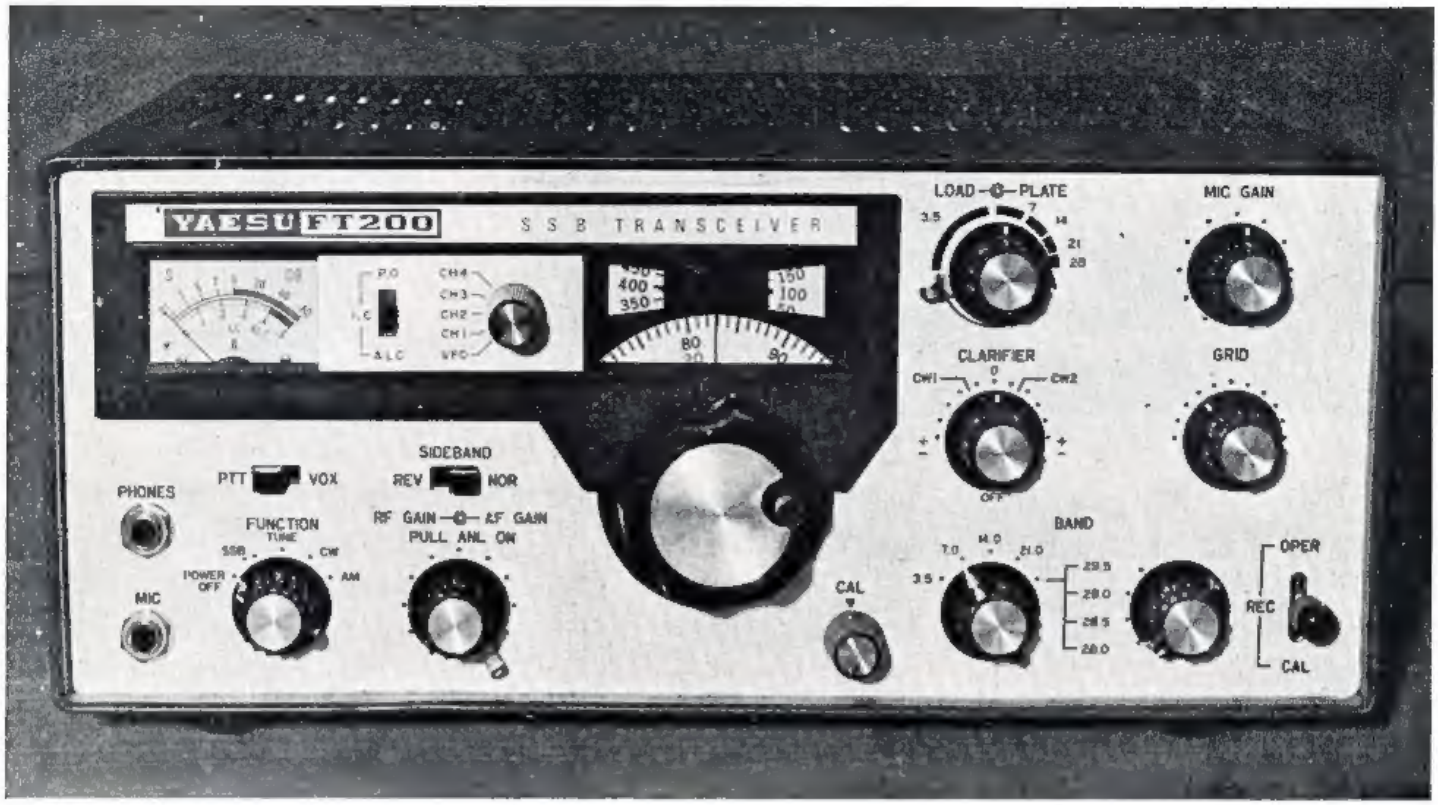

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